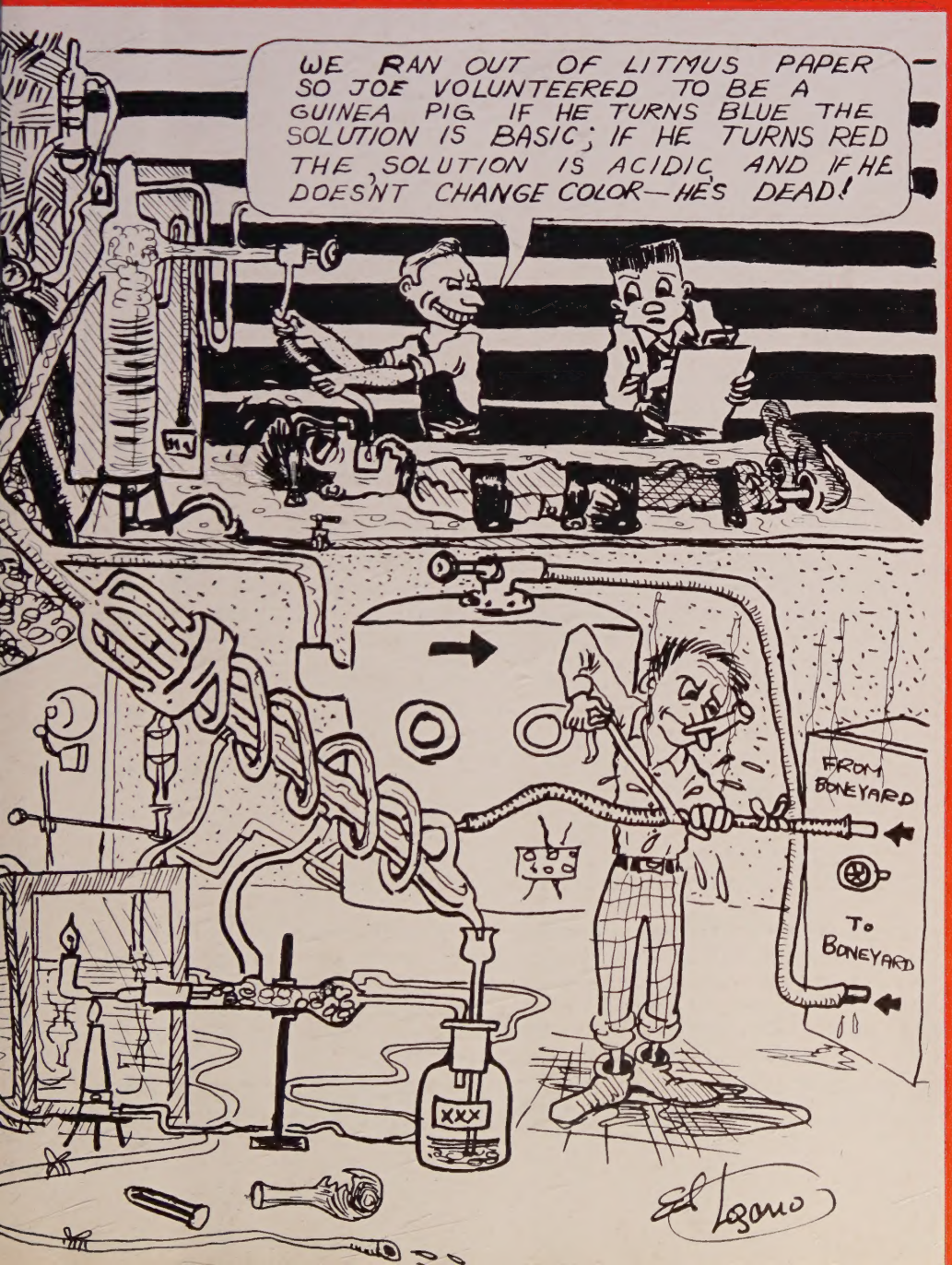
the Illinois Technograph

MAY, 1950


WE RAN OUT OF LITMUS PAPER SO JOE VOLUNTEERED TO BE A GUINEA PIG. IF HE TURNS BLUE THE SOLUTION IS BASIC; IF HE TURNS RED THE SOLUTION IS ACIDIC AND IF HE DOESN'T CHANGE COLOR—HE'S DEAD!
FROM BONEYARD
TO BONEYARD
XXX
Ed Lozano

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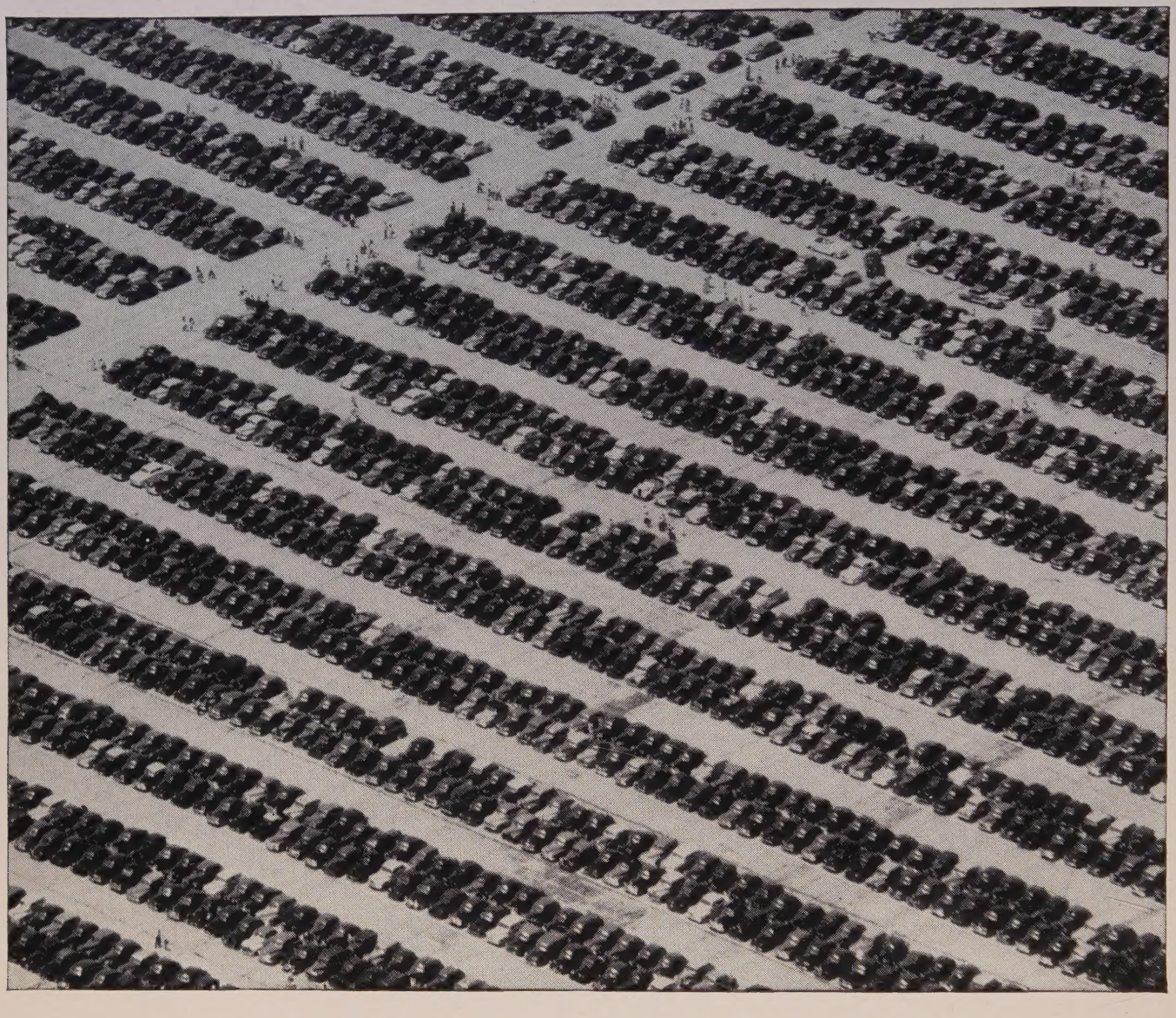
★

TWENTY-FIVE CENTS

6,250,000 in 1949—*another new record*



THE automobile industry smashed records again in 1949 as it produced 6,250,000 new passenger cars and trucks —more than in any other year in history. This terrific output of the finest cars ever made climaxed a phenomenal rise in production that began at the war's end.

These new cars by the millions are a tribute to the American way of life. Their production is the result of the demands of people working under the American system of free enterprise, which has produced the highest living standard the world has ever known.

Millions of tons of steel of almost every type and form helped America's auto makers boost their production so amazingly high . . . helped the quality of today's automobiles keep pace with the quantity. In fact, many new steels have been developed just to meet the exacting requirements of present-day production.

In spite of record-breaking production, the automobile industry's job is far from finished—the average age of the cars on America's highways today is 8.4 years.

Continuing demands for vast quantities of steel from the automobile industry and from countless other sources mean a big job for the steel industry in coming years . . . mean a promising future for men who make steel their career. To assure itself management men of the highest caliber, United States Steel maintains a continuous training program that prepares young men with suitable backgrounds for places in this great industry.

College engineering courses lay the foundation . . . United States Steel builds a practical knowledge of steelmaking on this foundation.

AMERICAN BRIDGE COMPANY · AMERICAN STEEL & WIRE COMPANY · CARNEGIE-ILLINOIS STEEL CORPORATION · COLUMBIA STEEL COMPANY
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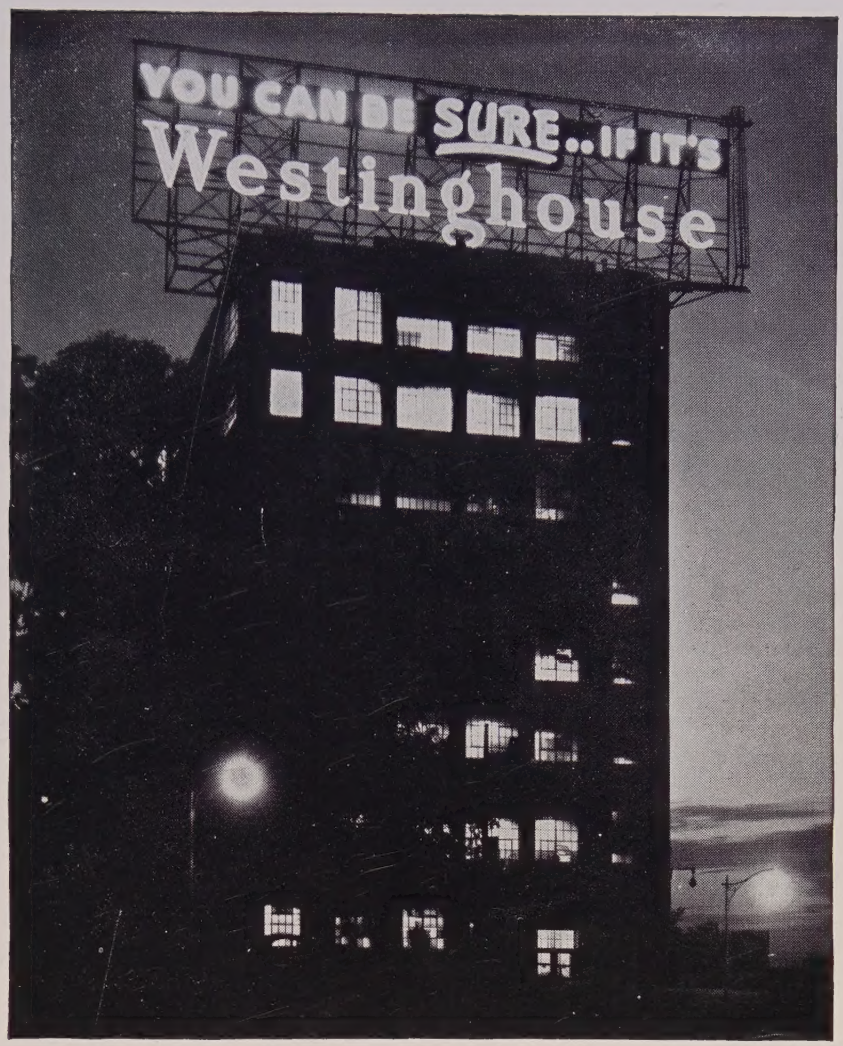
UNITED STATES STEEL

A Name to Remember



Tomorrow . . . when you start playing for keeps . . . names will assume new importance. Reputations are built on ability to produce . . . effectively . . . efficiently . . . economically . . . built on results delivered.

Since its inception, Westinghouse has recognized this principle . . . has been guided by this premise in each of the thousands of undertakings it has initiated.

In the university, where your work is judged on thoroughness and accuracy, you have learned to rely on Westinghouse laboratory equipment.

As you enter business, you will learn that this great name in engineering and industry will mean even more to you.

Whether your success is at stake in the college laboratory or in the business world, the broad experience and established reputation for excellence in engineering and manufacturing that Westinghouse has built through the years will be available to you.

As you enter industry, you will meet new problems that will bring you in contact with many types of products, processes and methods. Because Westinghouse products play a vital role in practically every industry, our paths will likely cross many times. We will always welcome the opportunity to serve you . . . guided by uncompromising principles . . . principles that are required to fulfill the commitment . . .

G-10068

YOU CAN BE SURE . . IF IT'S Westinghouse

New Developments

By Henry Kalapaca, E.P. '52
and Tom Tucker, Ch.E. '53

Gas Turbine Locomotive

The nation's first gas turbine-electric locomotive made its public debut recently before rail executives assembled at the General Electric's Erie, Pa., works.

G. W. Wilson, manager of G-E's locomotive and car equipment divisions, said the prime objectives of the gas turbine-electric locomotive designers were to develop a prime mover that would:

1. Burn low grade fuels, especially coal, economically.
2. Give higher horsepower output per pound and per cubic foot.
3. Have greater reliability and lower maintenance cost.

The developmental unit exerts about twice as much horse-power at the rails as a diesel-electric locomotive of comparable size. It burns low grade bunker "C" oil, but Alco-G.E. spokesmen expressed the hope that research may lead to a successful means for burning coal.

In fuel consumption, the present power plant is "much less efficient than the diesel engine."

"Improvement in design and the use of better alloys, however, can and will increase this basic efficiency."

Knowledge gained from General Electric's wide experience in the aircraft gas turbine field was utilized in the design of the power plant. However, the locomotive gas turbine differs from the aircraft jet engine in that the gases it produces are harnessed within the power plant and the resultant power is transmitted electrically to drive the wheels, whereas the aircraft engine provides forward thrust from the reaction of its exhaust stream.

The locomotive is of single cab construction with B-B-B-B running gear and an operating station in each end. It develops 53 horsepower per foot of length, weighs 500,000 pounds and has a continuous tractive effort of 68,500 pounds at 20½ miles per hour. It is 83 feet, 7½ inches long inside of knuckles, 14 feet 3½ inches high over roof sheet and 10 feet 7 inches wide over hand rails. Geared for 79 *mph*, the locomotive carries enough fuel for 12 hours of operation at 4,500 horsepower.

Self-Lubricating Ski

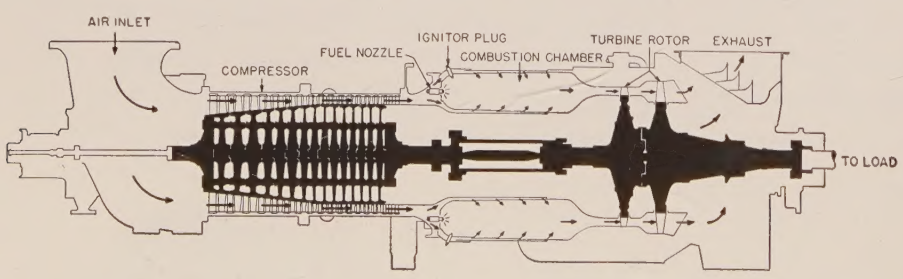
Micarta, the same tough plastic used in Army helmet liners during the war, now promises to enable American ski champions to set new speed records.

The Bancroft Racket company is making a new self-lubricating ski with bottoms made of Micarta—a laminated plastic developed and produced by the Westinghouse Electric corporation.

Micarta is as strong as structural steel for equal weights of cross-section and will add greater strength to the natural hickory to which it is bonded. The plastic is lighter than aluminum for equal strength.

It was the use of Micarta for ship propeller shaft bearings that brought the ski application to light. Made of layers of cloth saturated with a synthetic resin and pressed under heat, the plastic is lubricated by water—which means a ski in constant contact with snow and moisture becomes self-lubricating.

This means not only more speed, but also no necessity for waxing, except in very wet snow conditions where snow clings. The Micarta-bottomed skis, because of their toughness, need not be sanded, regrooved, refinished or relacquered over years of normal service.



The new General Electric gas turbine for locomotive use. (Courtesy of General Electric.)

Electronic Torch

An "electronic torch" has been developed by scientists of the General Electric Company's research laboratory, which is hot enough to cut holes in firebrick and to melt tungsten.

Dr. J. D. Cobine told the Conference on Gaseous Electronics of combining high-frequency radio signals and certain gases to produce temperatures considerably higher than the melting point of tungsten, which is 3370 degrees Centigrade.

He emphasized that the electronic torch is still at the laboratory stage, and that its commercial possibilities have yet to be explored.

Heart of the torch is a tube known as a "magnetron," which produces radio waves with the extremely high frequency of one billion cycles per second. Leading from the tube is an antenna made of two short metal cylinders, one within the other. If certain gases, among them nitrogen and carbon dioxide, are fed past the high frequency arc, which forms at the end of this antenna the electronic jet torch results.

The molecules of certain gases are broken up into atoms by the high-frequency arc. As these atoms reform into molecules on the surfaces placed in the torch large amounts of heat are generated. The jet itself is not necessarily hot.

Tracer Photographs

Scientists studying growth and deterioration of body tissue may now locate single cells by a process called autoradiography. The achievement is expected to widen the scope of radioactive tracer research in biology and medicine. Radioactive tracers enable scientists to learn more about the processes of the human body. Formerly, however, medical researchers were unable to pin down tracers to a single cell in a tissue section.

In an experiment conducted at the University of Rochester, a microscopic slice from the liver of a rat which had been given radioactive carbon was placed directly on a photographic plate. Beta particles emitted from atoms in the liver cells bounded into the emulsion, developed by Kodak Research Laboratories, and exposed tracks of silver bromide grains, After the plate was developed in the usual manner, a pattern of black silver grains showed the tracks of the beta particles through the emulsion. By examining this pattern under a high-power microscope and tracing it back to the tissue, it was possible to determine the cells from which the electrons started.

Biologists and medical scientists hope to use the new technique to learn the effects of organic and inorganic substances on individuals to which radioactive tracers have been given.

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the Illinois Technograph

Volume 65 **Number 8**

The Tech Presents

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OUR COVER

Cartoonist Ed Lozano depicts the Chemical Engineers busily engaged in one of their extensive experiments. Rumor has it that this project has replaced the heretofore acknowledged but hackneyed standard report on the distillation of alcohol.

Engineering Parade and I SEE

The crowds were milling around the Boneyard campus—alternately looking northward along Burrill Avenue, then down at the Boneyard. The campus police were patrolling the area to keep the over-anxious out of the street and out of the slimy waters where the much-publicized appearance of St. Patrick was to take place.

Most of the concentrated attention was directed toward the nipple of pipe that protruded above the surface of the Boneyard just west of Burrill Avenue and behind the Electrical Engineering Building. From this spot the Geyser of St. Patrick had gushed hourly up until the fateful hour when the Blarney Stone was stolen from the engineers. But now the Stone was back in the hands of its rightful owners, and St. Pat was eagerly awaited, since he had promised to be among the celebrants on this weekend of March 31-April 1.

The crowds perked up to the sound of drums to the north by Illinois Field, and in a minute the second regimental band, directed by Lyman A. Starr, turned onto Burrill Avenue. Everyone took a second look to see that cameras were adjusted and then turned again toward the oncoming parade.

A sudden explosion in the Boneyard attracted all attention toward the E. E. Research Lab. In rapid succession, two more explosions followed; and to the west, the green Geyser of St. Patrick gushed once more.

Just as the band passed over the Boneyard bridge, another series of fast explosions was heard from the stream bed, and a dense cloud of smoke arose. When the smoke cleared away, the thousands of celebrants cheered the dramatic appearance of the genial old gent, St. Patrick.

In knee boots and carrying a spade over his shoulder, St. Pat strode up the stream and waved to his many admirers. Dean W. L. Everitt approached the murky waters and helped the old gentleman up the bank and then over to St. Pat's waiting chariot.

His chariot was quite appropriate. Sitting conspicuously atop the shiny new convertible was the beloved Blarney Stone. On the four fenders rode the military guard, which was assigned to guard the valuable momento. And in the driver's seat was Dick Stone, the electrical engineer who, with Jim Winston, had heroically recovered the Blarney Stone from the journalism students.

St. Pat was dressed as an Irish country gentleman (of course!) with a black silk hat, black suit, and a brilliant red beard and wig.

After St. Pat fondly cuddled his beloved token, the parade accelerated from its zero velocity and took a tour toward south campus. While cameras clicked and the co-eds cooed, the typically engineering floats displayed the subtle humor and ingenuity of the "Boneyard boys."

The parade returned to Green Street and passed the reviewing stand in front of Civil Engineering Hall. There St. Pat alighted and admired the work of his inspired engineers as the rest of the floats passed by.

On the reviewing stand were the official parade judges: Bob Fitzgibbon, editor of the *Illini;* Larry Siegel, editor of *Shaft;* and Chuck Flynn, publicity supervisor of the Athletic Association.

Their decision regarding the floats entered by members of Engineering Council listed the following as the top three:

IAS presented the most beautiful float—partly because of the beautiful blonde "test model" that rode atop the mock-up wind tunnel. Lacking an aero engineer with sufficient wind, they had a hand bellows supplying the breeze. The pilot in a miniature airplane at the rear of the float tossed paper airplanes and flying saucers to the crowds. Working under Cliff Felt, Byron Gabbert was in charge of this masterpiece.

The chem engineers put a bit of their new building on wheels and presented the U. of I. chemical plant—replete with smoke, slime, and sm . . . perfume.

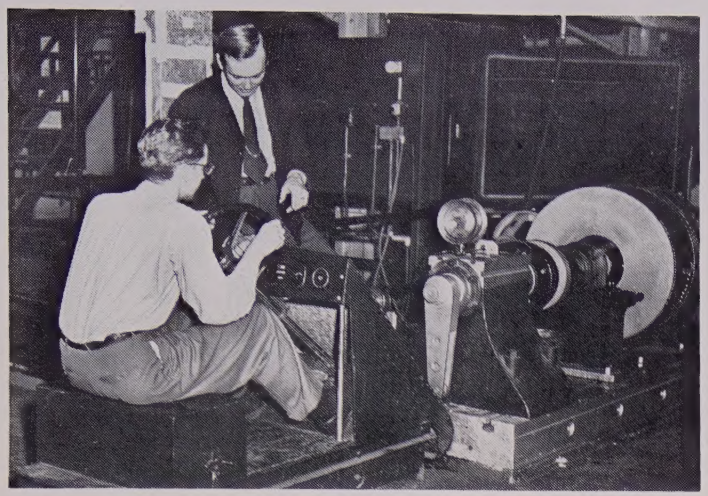
With four ag engineers as the team of horses, ASAE presented a contrast of farming methods before and after the invasion of engineering into the realm of agriculture.

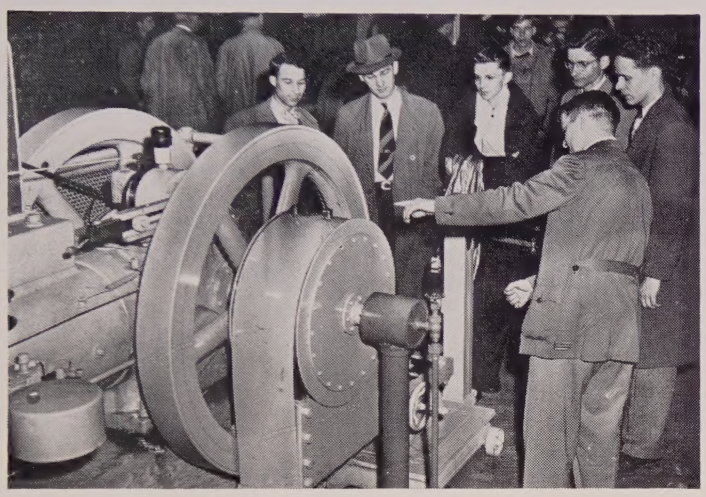
Tops among the floats in the "non-member of Engineering Council" competition were the engineering physics students, Mu-San, and Chi Epsilon.

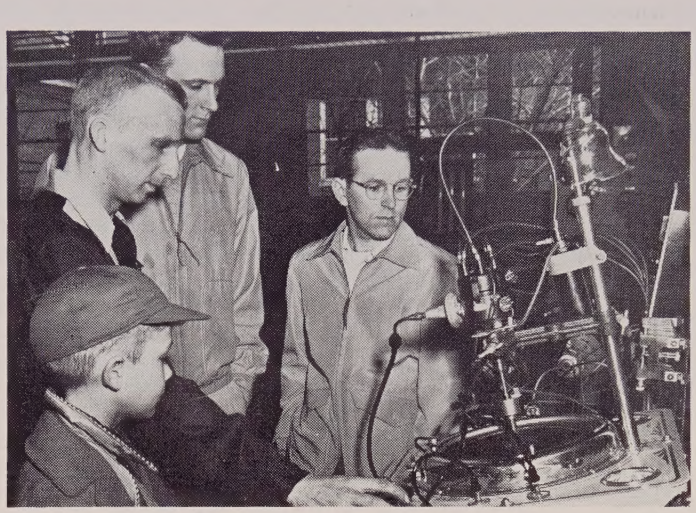
The physics boys took off—or tried

(Continued on Page 24)

One beautiful test model plus 5,000 paper napkins yielded a trophy to the Institute of Aeronautical Sciences for one of the best floats in the Engineering Parade that preceded I SEE. (Photo by Felix Ou.)







Top left: An A.S.E. guide shows a visitor how to operate the mechanism of the driver's reaction testing device. **Top right:** The process of flotation separating is demonstrated by the Mining Engineers to an interested onlooker. **Lower left:** A horsepower producer of a bygone era attracts attention in the Mechanical Engineering Lab. **Lower right:** Four slightly baffled visitors try to fathom out the distributory system on display. (Photos by Howard Wedelstaedt.)

M E. STUDENTS TEST UofI POWER PLANT
FACULTY AND STAFF GIV
FULL COOPERATION AND SUPPO
PI TAU SIGMA MECHANICAL ENGINEERING HONORARY

Left: The Mechanical Engineers crusade power plant testing with their unique float. **Right:** A sure way to get away from it all is demonstrated by the Engineering Physics department. The latest report has it that the latter alternative was taken. (Photos by Felix Ou.)

Story of the Blarney Stone

With a bit more fanfare than Moses had, I was discovered among the slimy rushes of the Boneyard at 4 p. m. February 10, 1950. This glorious beginning of my well publicized career was described in the March *Tech*.

For about a month after my crashing the news I was placed in solitary confinement—not for misbehavior, but for my own security. The cold walls of the safe in C. E. H. seemed to feel sorry for me—such a prodigy without any recognition—but their compassion was little comfort to my heavy heart.

Finally on March 13 I was given my rightful recognition by my protectors and my public. Along with some pictures of my discovery and a bit of blarney about coming events, I was placed on a beautiful kelly green (I love that color!) pillow in the Illini Union Bookstore window. There I winked at all the passersby and reminded them of the green geyser that sprinkled hourly from what had been my resting place for centuries.

Incidentally, I don't believe everyone understood the purpose of St. Pat's Geyser. Being the first engineer upon this earth, St. Pat had an interest in sanitary engineering as well as some of the more prominent fields. My inscription, "Flush Ye Boneyard," attested to this activity of St. Patrick. Twelve centuries ago he started the campaign to clean up the Boneyard. As nothing had been done about the bilge and the local citizens were against a recent proposal to clean it up, St. Pat himself brought forth his geyser of disinfectant that not only turned the murky mess into an emerald green, but purified the putrid waters as well.

When Friday, March 17, came around I was particularly happy, as this was the birthday of the one responsible for my inception. I didn't have the opportunity to celebrate like the rest who worship my patron saint, but I nevertheless revelled in the glory of days gone by and those to come.

About 7 o'clock that evening I was rudely shaken from my dreams by two rough hands that lifted me from my comfortable resting place. They smoothed out my pillow to leave it looking pretty, but I was treated like an ordinary rock from the University rock gardens on south campus. These two unfamiliar faces that disturbed my placid thoughts were brutal and utterly disrespectful of my age and importance.

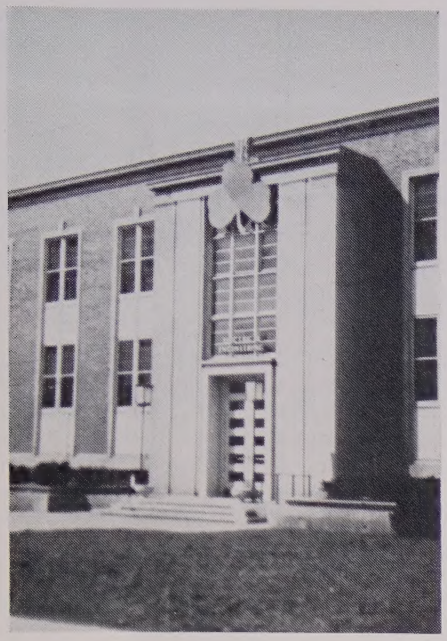
The next Tuesday morning, after engineers had been worrying about my whereabouts (and rightly they should have) there appeared in *The Daily Illini* a story about my sad experience as a displaced person.

The Illini authority, apparently knowing more than I did about the awful act said that "the kidnaping of the stone was accomplished in full view of hundreds of passersby. The pranksters, or thieves, persuaded the janitor to remove the 'bit of auld Erin' from the window of the bookstore by representing themselves as engineers sent to get it for a St. Pat's party."

The authority went on to say that some persons were accusing law students or high school students here for the basketball tournament that weekend. He also inferred that engineers might have stolen it themselves in an effort to arouse a bit of interest and publicity. True, I am happy in the arms of an engineer, but there is no engineer alive who would use a sacred token like me for such a base purpose as mere publicity.

Just before Engineering Council meeting, Thursday, March 23, Dick Myers, Council president, received a scroll from his patron saint and my godfather. The browned and worn parchment contained this ominous warning from St. Pat:

Left: St. Pat arises from the Boneyard amidst explosions and smoke to join the parade and reign over the I SEE activities. **Right:** The A.S.A.E. won third place with their float displaying modern and ancient farming methods. (Photos by Felix Ou.)



One of the shamrocks that so mysteriously appeared on four of the engineering buildings one bright Saturday morning. (Photo by John Huber.)

"Know ye, O President Myers and ye Council
That I be displeased wi' ye
F'r allowin' th' stealin' o' me beloved Blarney Stone!
F'r this act, I wave me shillelagh slide rule
An' hereby decree that th' Geyser
Will appear unto ye no more
Until me stone be brought back.
Know ye that th' stealers o' me stone
Be certain ones among th' law or journalism students.
If ye recover me Blarney Stone,
I will appear before ye
In a right mysterious cloud o' smoke.
An' if ye do not recover it,
Woe betide th' College o' Engineering,
F'r me wrath will know no bounds!
An' I will haunt this campus wi' me Shamrocks
Until ye do get me stone back!
Mark ye well my words!
Signed: St. Pat."

The world was soon to learn, that as well as having infinite mercy, my inceptor can show infinite wrath.

St. Pat just barely began his haunt of the campus with a Shamrock Scare, when those responsible for my displacement came forth with an admission of guilt. The four main engineering buildings along Green Street blossomed forth with beautiful green 8-foot shamrocks on the Saturday morning of March 25. They caused considerable excitement among engineering and south-campus students, as well as most of the University police force and the Physical plant. (The latter group, which supplies the University with power and wields plenty itself, had the shamrocks removed that afternoon.)

But the big accomplishment of the Shamrocks was to scare the officers of Sigma Delta Chi, "professional" journalistic fraternity, into admitting their possession of the beloved token of St. Pat. However, in a guilty attempt at reconciliation and "to show that journalists are tolerant of the bigoted attitudes of other groups on campus . . ." SDX offered to return me to my rightful owners at St. Pat's Ball if certain humiliating concessions were made.

The following Monday evening at a group meeting of all engineers working on I SEE and St. Pat's Ball committees, the chairman of the former committee proposed a compromise to SDX in order to regain my presence for the St. Pat's parade the following afternoon. Arrangements were made for a tug-of-war between 20 journalists and 20 engineers with me in the middle—the dividing line and finish line for the tussle. The winning team (and there's no doubt who that would have been) was to carry me off triumphantly to their halls of learning on north campus.

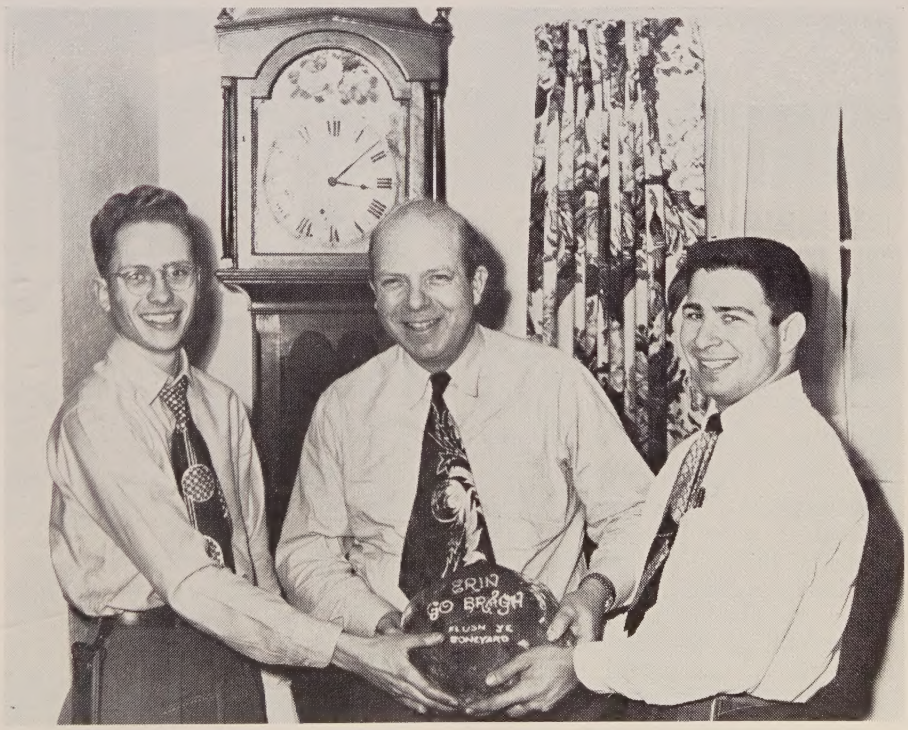
Thursday, the day when the tug-of-war was to be pulled off, the *Illini* printed the following admission: "Bob Roderick, president of Sigma Delta Chi, professional journalism fraternity, admitted that the stone is no longer in SDX's possession. A member of SDX, Bill Muster, had been carrying the stone in the luggage compartment of his car. But it wasn't there when he looked yesterday afternoon."

The journalists were even a bit more lax in guarding me than were the engineers. Two engineers (and *Illini* photographers), Dick Stone and Jim Winston, drove to Chicago Tuesday afternoon, March 28, to get me from Mrs. Bill Muster who, they thought, had me in a bureau drawer.

After Mrs. Muster said that Bill had me confined to a grip in the luggage compartment of his car, Dick and Jim sped back to Chambana to rescue me from my claustrophobia. They picked up Muster's car keys while he dreamed unsuspectingly, slipped me out of his car, and returned the keys to his bedchamber.

After a rousing phone call to Dean W. L. Everitt, my heroes drove over to his Pennsylvania Avenue residence to present him with me. The Dean was as happy as I was, so we four got a picture taken in front of the grandfather's clock at 3:08 a. m.

Dean Everitt, Dick Stone, Jim Winston, and I then returned to what was left of a happy night of slumber—after I was carefully placed in the house safe. And happily there I remained until that glorious Friday afternoon parade and then the Saturday evening when I was carried to my pinnacle at St. Pat's Ball to bask in the radiation of the green spotlights and enjoy the fond admiration and awe of my loyal dancing audience.



Dean Everitt happily accepts the Blarney Stone from Jim Winston and Dick Stone who liberated it after its capture by south campus individuals.

ST. PAT'S BALL

After three spine-cracking weeks of work, the engineers finally said "Amen" the night of April 1.

Following well-coordinated plans, doors closed on a successful I SEE at 6:00 p. m. and de-slideruled engineers and their dates took off for the annual St. Pat's Ball that was held that night in Huff Gymnasium from 9:00 to 12:00 p. m.

Bud Roderick and orchestra set the pace with amazingly fine dance music and plenty of Irish waltzes thrown in for good measure. Vocalist Jene Ferrell, who made her singing debut with Roderick on this night gave song renditions that soothed the jangled nerves and aching backs of many an engineer who had driven nails and hauled machinery during the last few frantic days of preparation for the Exhibit.

The legendary Blarney Stone that had set the keynote for the spirit of the entire weekend, reposed on green velvet on a large platform in the middle of the dance floor. Behind the bandstand at the south end of the gym, a 25-foot shamrock adorned with a large slide rule hung against a white back-drop. The ceiling of Huff Gym was "lowered" an impressionable 30 feet by a false ceiling of green and white crepe paper. Finishing touches were seven smaller 8-foot shamrocks hung from the balcony.

These balcony shamrocks were the center of some speculation during the evening. A general (though unspoken) consensus of opinion was that these were the famed shamrocks that had made mysterious appearances on the fronts of the four main engineering buildings along Green Street the previous Saturday morning during the Shamrock Scare.

Couples who tired of dancing during the evening were interested spectators of some of the I SEE displays that had been brought down to the Gym after 6:00 p. m. One of the most popular participation exhibits was the E. E.s' "Kiss-o-meter," that gave short but brittle ratings of an individual's mastery of the art of kissing, with such comments as "cold," "luke-warm," and "red-hot." For the thirsty, the "Coke-tail" bar operated full blast in the lower regions of the gym.

Intermission at 10:30 p. m. began with a short introduction of Bill Bierbaum, (by Bill Bierbaum), who carried the ball as Master of Ceremonies. Bill, now well-known for his M. C. work at three successive St. Pat's Balls, next brought forth the Theta Chi octet for harmonizing on a few Irish ballads.

Bill then turned attention toward the Blarney Stone where St. Pat, the loyal patron saint of the engineers, now appeared to dub his faithful eleven as Knights of the Order of St. Patrick. (Rumor has it in higher engineering circles that the patron saint was enacted by Prof. John S. Crandell of the Civil Engineering Department.)

The Knights were outstanding seniors who had been selected by Engineering Council from 200 nominations on a basis of scholarship and outstanding work in engineering activities. Those receiving this honor were Hank Kahn, Bruce Everitt, Al Benson, Gene Hankins, Errol Rodda, Dick Myers, Ray Hauser, Betty Lou Bailey, Maurice Cobb, Gerald Marks, and Keith Goodwin.

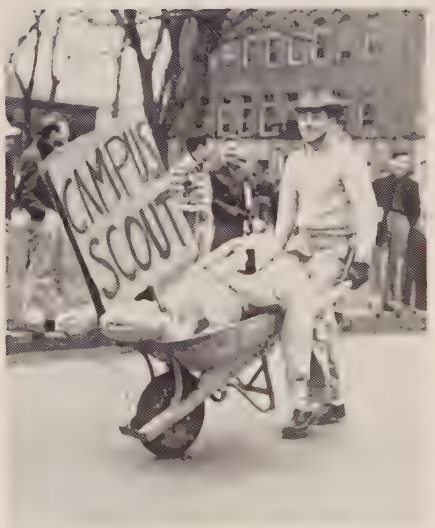
As his (or her) name was called off, each prospective Knight came forward, kneeled before St. Pat, was knighted, kissed the Blarney Stone as a proof of lasting devotion, and was then given a small gold shamrock charm engraved with the words, "Knight of St. Pat, 1950." Quite a few grimaces were seen on the faces of the Knights as they kissed the Stone, for rumor declared that shreds of slime and filth still coated the Stone, that had not been washed since its removal from the bed of the Boneyard. St. Pat pronounced any idea of washing the Blarney Stone a sacrilege, since the slime on the Stone's surface only enhanced the Stone's already savory glory.

Dick Myers, president of Engineering Council next presented the awards to the I SEE Exhibit and Parade winners. Copping honors for their very well-planned illumination show, IES took the I SEE Exhibit trophy. IAS won the Parade trophy for the best float entered by an Engineering Council member society, and the Physics Department won in the non-Engineering Council competition. The Parade awards were especially-designed engineering trophies planned and executed under the direction of George Vriend.

Dean W. L. Everitt wound up the intermission with a short speech of thanks to the committee of I SEE and to Dick Stone and Jim Winston, rescuers of the Blarney Stone after its theft by the journalists.

So another St. Pat's Ball came to a close. Only one sad note marred the evening. The unguarded Blarney Stone again disappeared—only this time, it will be for safe-keeping until another St. Pat's celebration rolls around in 1951.

Upper left: Betty Lou Bailey being knighted during the Knights of St. Pat ceremonies. **Lower left:** The St. Pat's Ball crowds intently watch as the trophies are awarded to the engineering societies for the most outstanding exhibits and floats. **Upper right:** Keith Goodwin kisses the Blarney Stone as a Knight of St. Pat. (Above photos by Al Augustyn.) **Center right:** Dick Myers, president of Engineering Council, presents the trophy for best parade float to Cliff Felt, representative of the I.A.S. (Photo by Jim Winston.) **Lower right:** Sigma Phi Delta, social engineering fraternity, display kindly inclinations toward the DAILY ILLINI'S famous columnist. (Photo by Felix Ou.)


CAMPIN
SCOUT

The Engineering Honoraries and Societies

By Joe Enrietto, Min.E. '52

SAE

One of the best meetings of the year was held March 22, when Wilbur Shaw, former Indianapolis Speedway king, spoke before a full house of 500 persons. A movie depicting the research and development of the engine of a racing car was also shown.

SAE and ASME held a combined meeting March 29 at which Mr. C. M. Bently, vice president of Deluxe Products Corporation, gave an illustrated talk on oil filters. Mr. Bently stated the theory of oil breakdown, and the effect it has on the engine of your car. He then gave a demonstration showing the difference between the oil of a car that has been driven with a filter in the engine and one which had no filter. He also pointed out that he had driven his car, which has an oil filter, 80,000 miles, and still hasn't changed the oil.

Mr. Ogg, the educational director of the Diesel Engines Manufacturing Association, spoke on "How Patents Affect the Engineer" at the April 18 meeting of the SAE. He stated that the aim of the original patent law was to furnish an incentive and reward to inventors by giving them a 17-year monopoly on their invention. Mr. Ogg told how modern industry handles patents by drawing up a patent contract. He pointed out that this philosophy is directly opposite to that of the original patent law. In explaining the actual procedure of obtaining a patent, he told of the value of a consulting attorney and of constantly keeping your applications on file.

AIEE-IRE

The past couple of months have been a period of recuperation for the American Institute of Electrical Engineers, due to the strain of I SEE. However, there was a good turnout for the meeting May 3 to hear Mr. James F. Farman, president of the national chapter of AIEE and vice president of the Consolidated Edison Company.

On May 16 the annual Buck Knight Trophy competition was held between AIEE-IRE and ASME. The history of this hilarious competition began November 27, 1927, when at a combined meeting of the E.E.'s and M.E.'s, it was decided that something should be done to create a closer relationship between the two societies. The two parties agreed on a quiz program with questions restricted to material of a non-technical nature.

Professor Abner "Buck" Knight of the E. E. department designed and constructed the trophy from a thimble, symbolizing Industry, a cuff link, suggesting Eternal Search, and some copper wire, signifying Adaptability. The wooden base was built by the M.E.'s during the time they had possession of the trophy.

The Buck Knight Trophy that is awarded to the winning team of a non-technical quiz contest between the E.E.'s and the M.E.'s.

Results of the quiz competition have been as follows:

Year	*Winner*
1940	AIEE-IRE
1941	AIEE-IRE
1946	ASME
1949	AIEE-IRE

The Buck Knight competition is fast becoming a tradition between the two societies; it furnishes many enjoyable surprises, and with Buck Knight as master of ceremonies, anything happens.

IAS

Activities of the Institute of Aeronautical Sciences most of this semester were concerned with organizing and setting up some good displays for I SEE. Clifford C. Felt was in charge of operations for this organization. In the St. Pat's Parade, the IAS float, "engineered" by Byron L. Gabbert, copped first prize honors.

At the April meeting, talks were presented by Mr. Gilbert C. Moseley, instructor in aircraft maintenance, and Mr. Jesse W. Stonecipher, chief flight instructor; both speakers were from the U. of I. Institute of Aviation. Their topic of discussion was airplane design —from the standpoints of maintenance and piloting ease.

The speakers discussed some of the inadequacies of present-day airplanes and presented a challenge to IAS members, as future aeronautical engineers, to improve light airplane utility and safety.

IAS officers this semester have been: Norman E. Gowin, chairman; Byron L. Gabbert, vice chairman; Loren Anderson, secretary-treasurer; Dick Myers, and Bob Johnson, engineering council representatives. The faculty advisor and honorary chairman is Prof. John M. Coan.

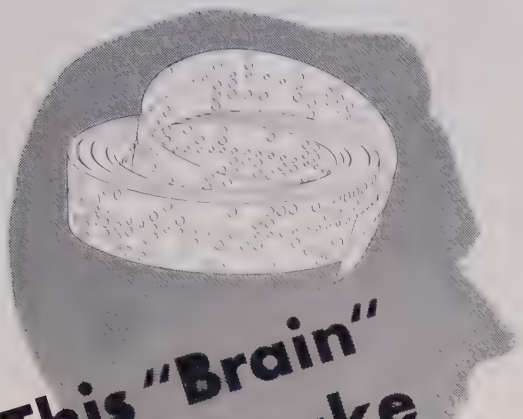
ASME

A student competitive talk was held March 29 to select representatives to go to the National Student Conference of the ASME. Maurice Cobb and Harlan Anderson were the winners, and therefore they represented Illinois at this conference. They were accompanied by Professor Francis Seyfarth and Gordon Chicoine, secretary of the ASME. The conference was held in Louisville, Kentucky, and consisted of a series of competitive talks on technical subjects by the student representatives of various colleges.

At the April 12 meeting, Professor T. C. Shedd spoke on professional engineering. He explained how the Illinois Engineering Act affects various engineers and pointed out the advantages of obtaining a professional license. Professor Shedd gave a brief history of the

(Continued on Page 28)

Newsworthy Notes for Engineers



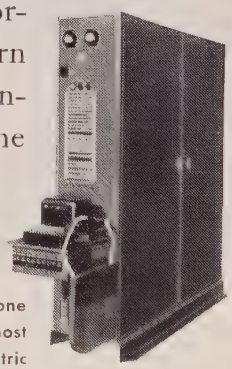
This "Brain" helps make better telephone apparatus

To improve the accuracy of testing Bell telephone switching equipment and to speed up tests during manufacture, Western Electric engineers designed and built a unique test set—known as the Tape-O-Matic—which has a paper tape "brain."

Controlled by a narrow paper tape, punched with coded information, the machine *automatically* performs complicated series of tests. If there is a fault in the equipment under test, the Tape-O-Matic stops, rings a bell and indicates the source of trouble on a lighted panel.

Some 1200 different tapes, varying in length from one to thirty feet, are used for testing various assemblies. Formerly an operator, in testing an average size assembly, had to make 41 individual connections. With the Tape-O-Matic, one multiple plug connection does the job. And 28 preliminary tests, 81 lamp observations and 71 key operations are replaced by one tape insertion and the push of a button.

The Tape-O-Matic can cut testing time as much as 80%—practically eliminates the possibility of human error—and helps to assure equipment of highest quality. It is a good example of the ingenuity, skill and thoroughness which Western Electric engineers put into making Bell telephone equipment.



The 1500-pound Tape-O-Matic is one of the largest, most complex and most versatile test sets that Western Electric engineers have ever devised.

Western Electric

A UNIT OF THE BELL SYSTEM SINCE 1882

Engineering problems are many and varied at Western Electric, where manufacturing telephone equipment for the Bell System is the primary job. Engineers of many kinds—electrical, mechanical, industrial, chemical, metallurgical—are constantly working to devise and improve machines and processes for production of highest quality communications equipment.

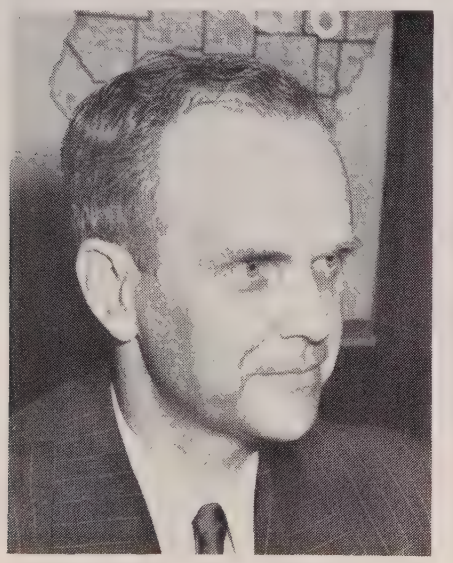
Introducing . . .

By George Ratz, C.E. '52
and Clarence Niebow, M.E. '51

PROF. RALPH C. HAY

Have you ever sat in a duck pond to watch a football game? If you are a loyal Illini, you certainly have. Prof. Ralph Hay, Associate Professor of Soil Conservation of the Agricultural Engineering Department, says that some of the oldtimers used to hunt ducks in the former swamp area where the stadium stands today. Many similar swamps that comprise the rich bottom lands of Illinois have long since been made available for farming by the introduction of engineering districts.

Agricultural engineering is a relatively new field; the methods of engineers were not readily accepted by the oldest industry, and in many places they are



PROF. RALPH C. HAY

still questioned. There are four major fields of study in agricultural engineering; rural electrification, farm power machines, farm structures, and soil and water engineering. Professor Hay heads the soil and water engineering department. This department is concerned with drainage, erosion, and conservation of soils. Since 1946, he has been the executive secretary of the State Soil Conservation District Board and the first engineer to be appointed to this board.

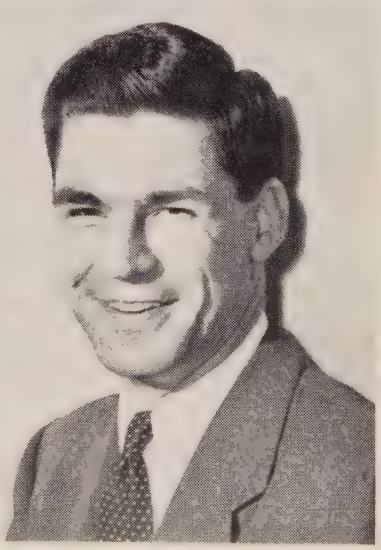
In addition to all his other activities, he is a member of the Committee on Flood Control and Water Flow Retardation of the Engineers Joint Council, one of the eight committees formed by the five or six leading major engineering societies for a report to President Truman on the state of the nation's water resources.

Professor Hay's success stems largely from a genuine desire to tailor his teaching to fit the needs of his students. Two types of courses are offered by the Agriculture Engineering Department: service courses are offered as practical training for agriculture students, and technical courses are offered for engineers. As the extension agricultural engineer for the University of Illinois for thirteen years, he has an intimate knowledge of nearly every soil conservation and drainage project in the state. His classes are greatly enhanced by his ability to give examples of class studies that have been instituted in each individual's home area.

In January of 1951, Professor Hay is taking sabbatical leave. He is planning to work on the development of teaching materials, laboratory techniques, and equipment for teaching soil and water engineering while attending Michigan State College.

LUCAS PFEIFFENBERGER

Small though the ceramic engineering student body may be, its members conduct activities on a scale similar to those held by some of the largest engineering societies on the campus. One of the key men of this group is Luke Pfeiffenberger, president of the SBACS, which, in engineering lingo, becomes "Seebacks," but to outsiders, refers to the abbreviation of the Student Branch of the American Ceramic Society.



LUCAS PFEIFFENBERGER

A native of Alton, Illinois, Luke enrolled first in the ceramic engineering courses offered at Iowa State College. During that period known as "the duration," he served in the Army for two and one-half years and was a member of the famed 20th Armored Division. Under a special Army training program, he returned to college studies for a short time at the University of Indiana. After receiving his discharge, Luke entered the University of Illinois in the fall of 1946.

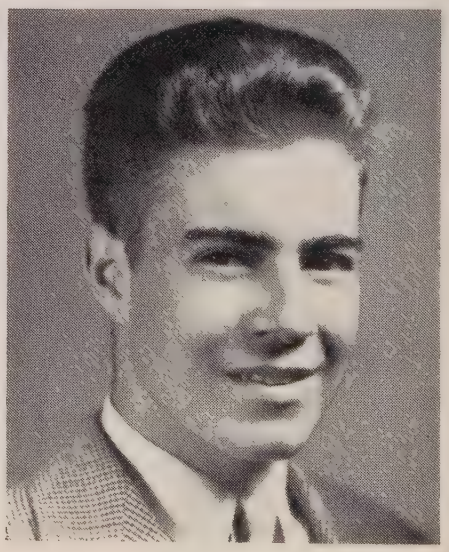
Besides his presidency of SBACS, Luke is also an active member of Keramos, ceramic engineering honorary, and of the social fraternity, Delta Tau Delta. Outside of the engineering campus, much of his interest is centered around McKinley Foundation, and the church choir, and the International Supper Club sponsored by the YMCA. One of his most recent activities was committee work on the engineering open house, I SEE.

Although not too positive on his future plans after graduation, Luke is expecting his particular field in ceramic engineering to be in sales or product development.

BURTON AMOS

In his first year on campus, Burton Amos has become one of the most active men in AFS, the American Foundrymen's Society. He is a sophomore in the production option of mechanical engineering.

Burton had a rather soft but interesting two year hitch in the Navy, that had its happy ending in August, 1948. As an AETM (aviation electronic technician's mate) he attended service school



BURTON AMOS

(Continued on Page 32)

New Duo-Cone loudspeaker, developed at RCA Laboratories, achieves the illusion of "living presence."

Music lovers' **"horn of plenty"**

For years, working toward the ultimate in sound reproduction, scientists have sought for *living presence*—the illusion that a musician or speaker is talking, singing, playing in your home.

Now, with RCA's Duo-Cone loudspeaker, the goal is achieved. Two soundcones in acoustical alignment reproduce sound without distortion, and give you every tonal value from a frequency of 30 on to 15,000 cycles. It is in the area above a frequency of 4,000—seldom touched by conventional speakers—that most of the all-important "overtones" lie. RCA's Duo-Cone loudspeaker reproduces every overtone—to the very peak of a violin's range—and faithfully gives you the deep low notes of a bass drum!

In addition, the RCA Duo-Cone loudspeaker's wide angle of sound pervades every corner of a room without sharply directed blast or blare. Its response to tones of every frequency is smooth, flowing, and even.

* * *

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In This Corner . . .

NAVY PIER

Opportunities Unlimited

by Irving H. Hallberg, M.E. '52
and Richard Hofmeister, M.E. '53

Due to the location of the Navy Pier in Chicago in the heart of the industrial section of the Middle West, students attending the Pier have the opportunity to observe every type of industry in operation ranging from foundries to assembly plants, from start to finish.

In the time it would take to hear a lecture, students can visit a factory and observe the actual methods, and see the work being turned out. These opportunities have not been wasted by the Pier engineers. They have taken advantage of these opportunities and explored them to the fullest extent. Classes in materials casting have visited pattern shops and foundry suppliers to see how the work is done, giving them a clear picture of engineering "know-how." During the Christmas vacation and between semesters, the student chapter of the American Society of Mechanical Engineers at Navy Pier sponsored a series of eight tours of plants including foundries, a steel mill, an assembly plant, machine shops, and a gas plant.

A typical plant of those visited is the Pettibone Mulliken Corporation. This organization falls in the medium size classification of industry, having a parent company and several subsidiaries. Here the entire process of manufacture can be viewed at a glance. The designing, fabrication, machining, assembly, and testing are completely handled by this one company. A brief description of the tour through the plant will illustrate this principle.

The trip through the Pettibone Mulliken Corporation included the Pettibone Mulliken plant, the Beardsley and Piper Division plant, which is a subsidiary of Pettibone Mulliken, and the engineering building. After a brief breakfast, the tourists, numbering about 53 engineers from the Pier and from the Urbana campus and eight instructors were divided into five groups. Each group, consisting of about ten students and several instructors, were provided with a guide who was a member of the management.

Beginning in the forge shop, the group observed one of the important methods of fabrication. The huge drop hammers provided an unusual and awesome sight for the visitors. From here, the tour moved to the foundry where the casting process was reviewed. Molding, core-making, melting in electric furnaces, shakeout, and cleaning were seen in operation. One of the most interesting and unusual machines was the sandslinger which was developed and is manufactured by Beardsley and Piper. This machine slings sand into a mold at the rate of 1600 pounds per minute, giving a firmly rammed mold in one operation.

The machine shop was next in line to be visited. Here the machining of manganese steel, of which Pettibone and Mulliken is the country's largest producer, was seen. Gang drills in operation sparked the interest of the engineers, as did the grinding of manganese steel frogs. Each rail frog is constructed to different specifications and therefore requires a different pattern. As most of these frogs are about fourteen feet in length, each job requires a great deal of pattern work.

NAVY PIER STAFF

Ronald Sak ..... *Editor*
John Solo Rio ..... *Ass't Editor*
Raymond Lindahl ..... *Business Mgr.*
John Nowicki ..... *Ass't Business Mgr.*
Alan Anderson ..... *Photographer*
Richard Medley, Lloyd Demel ..... *Associate Writers*

At noon, the visitors were treated to a lunch by the management. Following the meal, photographs of the various groups were taken by the editor of *Better Methods*, a company magazine which is widely distributed throughout the foundry industry.

During the afternoon the groups toured the Beardsley and Piper Division of the corporation, makers of foundry equipment such as the Spcedmullor, Sandslinger, and Screenarator. Operations in the machining, assembly, and painting of these devices were watched at this plant. For the benefit of the visitors, much of this equipment was explained and demonstrated. It could be seen that many variations in the sizes and types of a particular device are made to suit all possible needs. An example of this is the muller which ranges from a small wheelbarrow variety called the Mulbaro to the large Speedmuller which is several feet in diameter.

Following the completion of the tour, a question and answer session was held.

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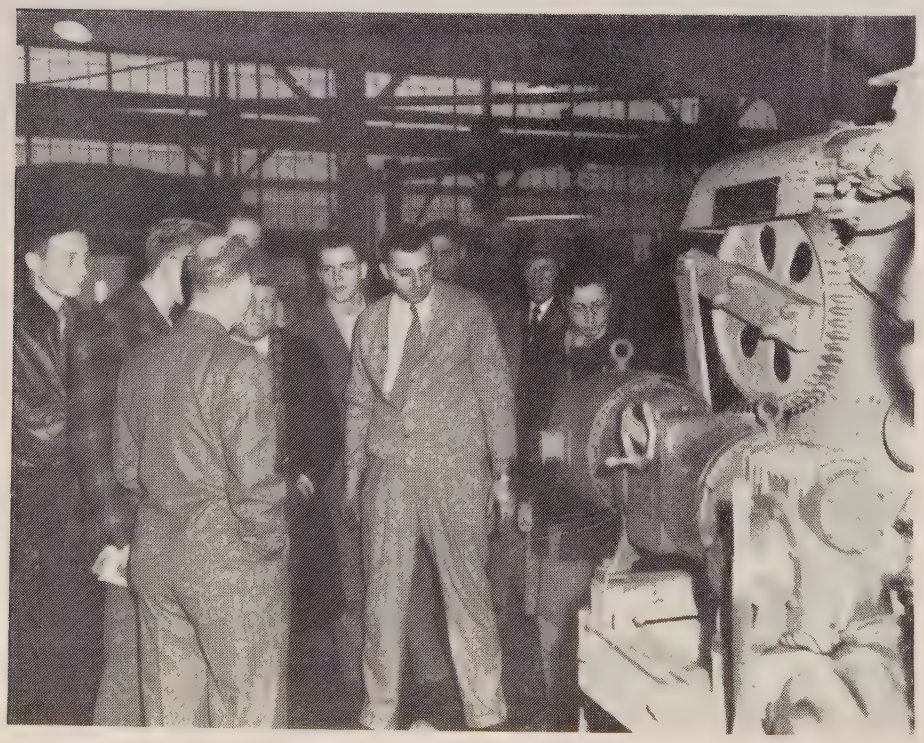

A guide explains the mechanism of the sand slinger to the Pier engineers at the Pettibone Mulliken Corporation.

Wayne King, "The Waltz King", is one of America's most popular entertainers. His weekly Standard Oil television show is a delight to see and hear—and it makes him one of Standard Oil's best salesmen.

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Let's assume that Standard Oil researchers and engineers have fully developed and tested a new, outstandingly improved petroleum product. Let's assume that the product has been made and distributed to Standard Oil dealer stations.

What happens then?

That's where Wayne King and all our other salesmen take over. They inform the public about this new product. And when the public buys, there's work for people to do all down the line: work for the service station man, for the refiner, the pipeline man, the driller. The more we sell, the more people we need to make new products. Our present employees become more secure in their jobs, and new jobs open up.

Good salesmanship, you see, is vital to all of us. But good salesmen must have good products to sell —and that is why research and product engineering, as carried on at Standard Oil and other progressive companies, is also vital.

Good products *plus* good salesmanship are an unbeatable combination that helps make our country great and the American standard of living the highest in the world.

Standard Oil Company

(INDIANA)

STANDARD

By Jack Ullman, Eng. Phys. '51 and Don Sweet, E. E. '53

While liberal arts students now outnumber engineering students at Illinois, this is one of the few schools where the engineers got there first, and the liberal artists came in later.

When the U. of I. got its start in 1868, it was known as Illinois Industrial University, and existed solely for the purpose of producing educated engineers and farmers. As such, it was one of the first engineering colleges in the country and was looked upon with suspicion by the traditional classical educators.

That these classical scholars had their fingers in Illinois Industrial University is shown by the entrance requirements for 1868-1869: the student had to know natural philosophy, algebra, geometry, Latin grammar, Caesar, Cicero, Virgil's Georgics and the Aeneid.

Life for the student was rough in those days. University housing consisted of a dormitory which also contained all of the school's laboratories. A ten-by fourteen-foot double room in the dorm cost only four dollars a semester, but you didn't get much for your four bucks. The rooms were unfurnished, and the occupants had to provide their own stove and beds. The 1868-1869 catalogue stated, "It is recommended for health's sake that the occupants sleep in separate beds."

The student was required to work at least an hour a day, usually on the University buildings that were under construction. For this work he was paid the princely sum of eight cents an hour.

The mechanical engineers really had a rough old time of it in the beginning. When the students of Mechanical Science and Art in the Polytechnic Department (as they were then called) went to their first classes, they discovered that they were provided with a lathe—but the power to run the lathe was in the form of a set of castings for a 10-hp steam engine. So as a shop project they turned out the castings, rotating the lathe by hand.

For many years a thesis was required of every engineering graduate. In addition, the engineers were required to write vacation journals every summer. These were supposed to include description, with dimensioned drawings, of every interesting machine the engineer saw. So you think you've got troubles?

* * *

FLUSH THE BONEYARD

* * *

In the days when the U. S. Navy consisted of a frigate and two flat-bottomed rowboats, our naval uniforms were amazingly ornate things, with gold piping on the trousers, gold epaulettes, and plumed hats. So it wasn't surprising that a British diplomat at a party should mistake an Americal naval officer for a doorman and say to him, "Call me a cab." The seaman smiled at the Englishman and said, "You're a cab." Then he looked the diplomat over and added, "And not a hansom one, either."

* * *

FLUSH YE BONEYARD

* * *

To the Boneyard
Beautiful stream flow on! flow on!
Thou stream which art the only one
That through the campus ground doth run.
Beautiful stream! Flow on! flow on!
Aye, flow thou on and get thee gone!
O Boneyard! Please flow on!

This poem is by Lucille Booker, '99, and appeared in the *Illio* of 1898. Which proves that even then people wanted to

FLUSH YE BONEYARD

* * *

Perhaps you are curious about what goes on at those physics colloquiums with the incomprehensible titles. A reporter for this column was, and satisfied his curiosity by attending one entitled, "Angular Correlation in Successive Nuclear Radiations." It turned out to be a pleasant, informal affair.

Festivities began at 4:15 in room 212 in the Physics building. People were met at the door by a charming lady physicist who served coffee and cakes. Almost every member of the physics staff and most of the graduate students were there, standing in little groups and talking. Going from group to group our reporter heard conversations about university housing, flushing the Boneyard, California politics, and women.

Later, after everyone had gone down to room 100, the full professors sat in the front row, associate professors were mostly in the second row, and so on. All conversation stopped as if a valve had been turned when Dr. Goldhaber of the Physics department got up and stood in front of the room.

Dr. Goldhaber introduced the speaker, Professor D. L. Falkoff of Notre Dame. Mr. Falkoff began his talk by saying, "I will spend the first half hour proving why angular correlation should not exist." And this he proceeded to do, speaking rapidly and with decision. When he had finished his proof, he said, "Since angular correlation does exist, there is apparently a paradox." He waited a moment, and added "But let me break the suspense." So he explained the paradox—to those who could understand him.

During the explanation he had some slides to show. The room was darkened and an assistant showed the first slide. It was upside-down. The assistant took it out, fiddled with it, and put it in again. It appeared upside-down and backwards. The assistant looked bewildered. Dr. Loomis, head of the physics department, strode up to the projector and in quick motion took the slide from the assistant and shoved it into the machine. It appeared on the screen in perfect order. Dr. Loomis smiled modestly as everybody applauded.

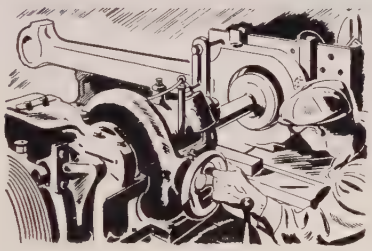
After Dr. Falkoff had finished his talk, he stood up against a barrage of questions. When everyone's curiosity was satisfied, Dr. Goldhaber suggested that everybody go upstairs for more coffee. His suggestion was followed with glee.

How Edwin Peterson might answer his 7-year-old son Paul. Edwin knows the answers. He's been around Norton for 30 years. In fact, ten percent of Norton employees have been on the job 25 years or more.

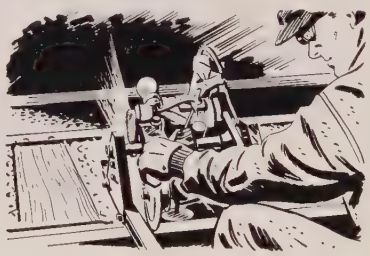
"GEE, DAD, WHY DOES IT HAVE AN UPSTAIRS?"

"To make traveling more fun. The idea is to give people more to see and do while riding faster and safer. That means more passengers for the railroads so that they can keep fares down and still add more comfort to long trips."

"Railroad comfort comes from many things, son. Smooth-fitting parts are important. Parts like Diesel engine crankshafts, pistons and wheels. That's why so many railroad shops use Norton grinders and Alundum grinding wheels to make parts smooth.



"Take those side rods on steam locomotives. They get farther over on the smooth side thanks to Norton internal grinding wheels. And parts are finished so accurately with Norton quality controlled wheels that they last for thousands of miles, Paul.



"Getting back to comfort . . . modern trains travel over 60 miles an hour. So, they need smooth rail joints. Those joints are welded for safety. Then, they're ground smooth and slotted with Norton grinding and cut-off wheels."

"Hundreds of other parts of modern railroad trains and tracks also get a lift from the sure touch of Norton Products. So does just about any other product you can name. That's why I'm not boasting when I say that Norton makes better products to make other products better."

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RAY L. HAUSER
Editor

•

CONNIE MINNICH
Associate Editor

the Illinois Technograph

Come Outta Your Shell!

In a speech class recently, two assignments were presented by two engineering students. By coincidence, the speeches took opposite views on an unspoken but well-practiced code of the campus this side of Green street.

One of these had as its general topic, "Why engineering students are entitled to remain aloof from outside activities." The author's explanations centered around the old assumption that engineering, as one of the more difficult college courses, required a great deal more study and preparation than other curricula.

The other speech set forth reasons why engineers, in particular, should be active in campus affairs. The author of this contention was not only an honor student in engineering, but was also one of the top campus leaders in extra-curricular activities.

Isn't it about time that we engineers stop hiding behind the college's skirts with the lame excuse: "Engineering is too hard; we don't have time for anything else"? No engineering curriculum is so hard that it prohibits participation in activities.

Isn't it about time that we admit the truth in recent *Daily Illini* editorials and columns criticizing engineers for lack of interest in campus affairs outside the classroom?

"Lack of interest" is an ugly little phrase, and one to which we of the dignified engineering profession are loathe to admit our guilt.

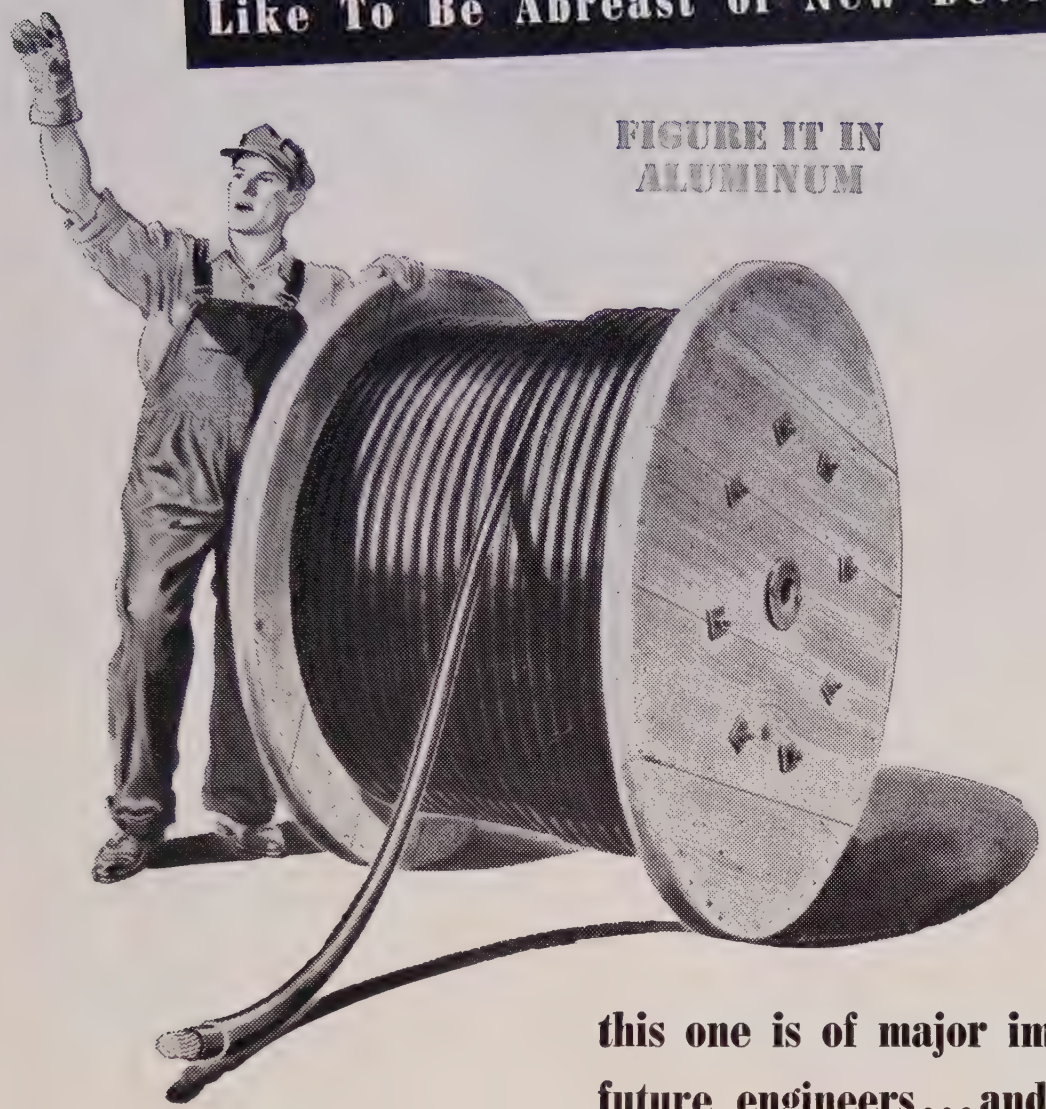
One of the very truthful but painful facts that recently stood in the way of obtaining Engineering Council representation in the Student Senate was the rotten example of this "lack of interest" in which a requested voting booth was installed on engineering campus during campus election day last year. Of about 3,000 engineering students that passed by its location on Burrill Avenue, only 60 bothered to cast a ballot! This is one incident that can't be passed off with the "gotta study" routine, since it requires only two minutes to vote.

However, the picture is not so murky as the first part of this editorial might have it seem. Engineering students *can* and *have done* excellent jobs in combining heavy academic studies and outside activities. One shining example of this was the recent I SEE and Engineering Weekend. A conservative estimate was made that at least 500 engineers devoted time to their individual society displays, floats for the parade, or general committee work during this period. We not only surprised ourselves and the faculty with the interest and hard work put into this project, but we also proved that only engineering ingenuity could have produced the fanfare and "Blarney" that certainly woke up the campus to the fact that "St Pat was an Engineer."

Of what good are such campus activities? Their actual value to the individual far exceeds the one purpose of showing a live engineering interest in campus activities; the reward will lie in the friendships, technical contacts, and associations with fellow engineers that will be worth more than gold in the years to come.

What we do here in college will be the beginning of our professional society activities which many of us will carry on throughout our lives. What we do here in college will also be the beginning of a broad outlook on the greatest of all professions—the Engineering of Life.—C. W. M.

Like To Be Abreast of New Developments?



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Meet the Staff

By John Huber, Ag. E. '52

CONSUELO W. MINNICH

For the first time in the *Technograph's* staid history of 65 years, it has a female editor-in-chief. She doesn't take office till next year so we must wait to see the *Tech* with its feminine touch. It will be a year to look forward to according to the editorial critic who, after reading one of Connie's articles, noted that "you should have more girls on your staff."

The *Tech* has felt Connie's influence for the past three years. This year found her capably fulfilling the duties of associate editor. She has had some nine articles and several features published in the *Tech*, so that she is no stranger to its readers.

CONSUELO W. MINNICH

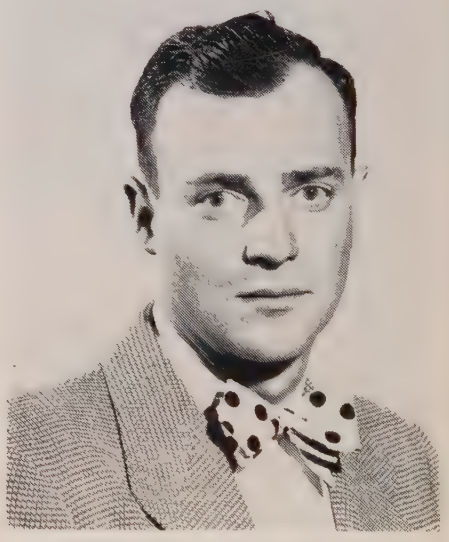
The fact is that Connie is also no stranger to most of the people in engineering circles on campus. Her many activities have brought her scores of acquaintances. She is a student branch member of ITE, ASCE, and is a member of ISPE. She belongs to Mu San, the sanitary engineering honorary, and was secretary last fall. She is a member of Alpha Lambda Delta and was its treasurer last year. The I SEE parade and much of the publicity for St. Pat's Ball was directed by Connie. Her tireless efforts not only contributed a lot in themselves but they also proved an inspiration to others working with her.

WILLIAM A. ANDERSON

The *Tech's* business manager for the next year will be Bill Anderson who, ironically enough, joined the staff three years ago because of his interest in engineering writing. He was assigned to the business staff because, as Bill puts it, "they had enough peasants on the editorial staff." His first year was spent performing general duties, but the next year found him promoted to the department of national advertising. This past year Bill has been assistant business manager in charge of national advertising.

If we delve into Bill's personal history we find that he and a twin-sister were born in Jersey City, New Jersey; but he has spent most of his life in New Rochelle, New York. He graduated from New Rochelle High School in June, 1940, with a major in business.

Five of the next eight years found him working in the field of heating, ventilating, and air-conditioning as a sheet metal mechanic. During the other three years he was superintendent of an aircraft sheet metal department at a sub-depot of the U. S. Army Air Force overseas.



WILLIAM A. ANDERSON

Bill then enrolled in the University of Illinois in mechanical engineering. His main interest lies in the perfection of air conditioning systems for small homes. After graduation in '51 he plans to become established with a corporation concerned with heating, ventilating, and air conditioning as engineer and manager. His operating territory will be Westchester County, New York.

It's always the fellow you'd like to recommend for a job who does not need a recommendation.

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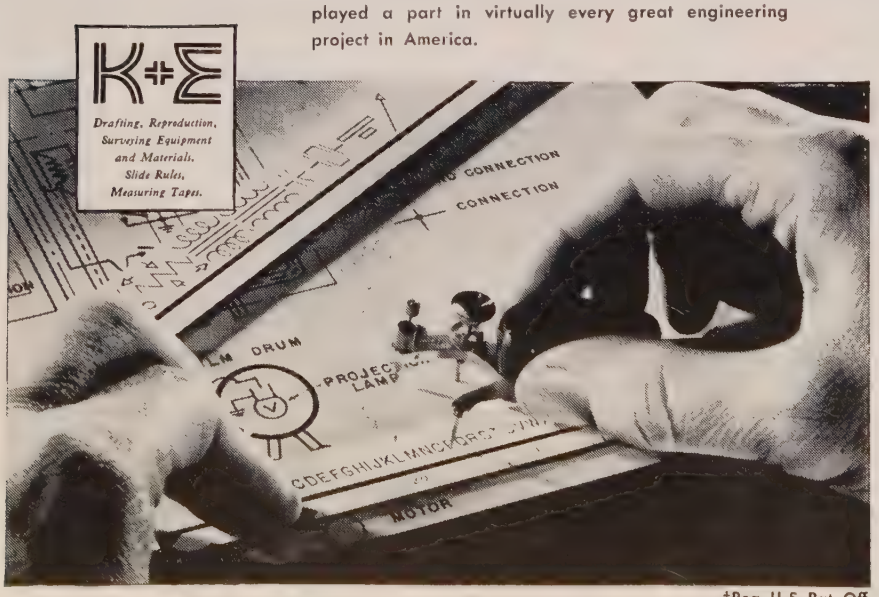

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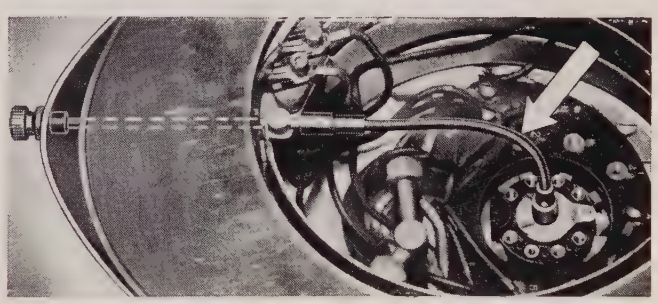

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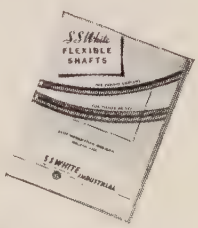

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Parade and I SEE . . .

(Continued from Page 6)

to—with a sign, "Venus or bust." The panel for their Buck Rogers venture flashed with colored lights from the fission of their atomic piles.

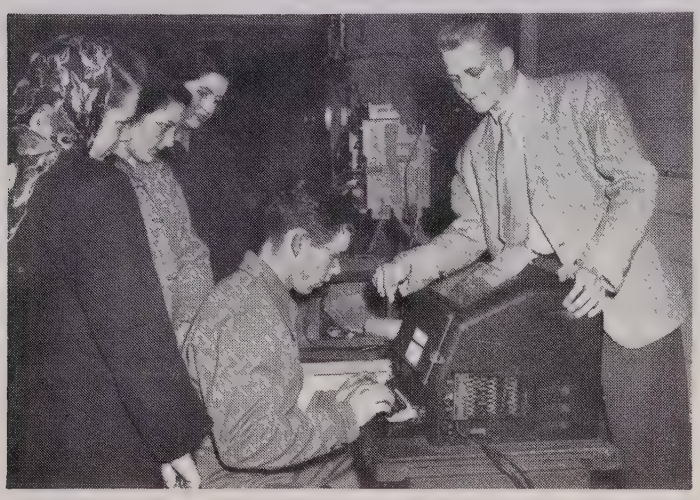
Mu-San, municipal and sanitary engineering society, left behind a trickle of green water, as they traced the treatment which water gets before, during, and after human use.

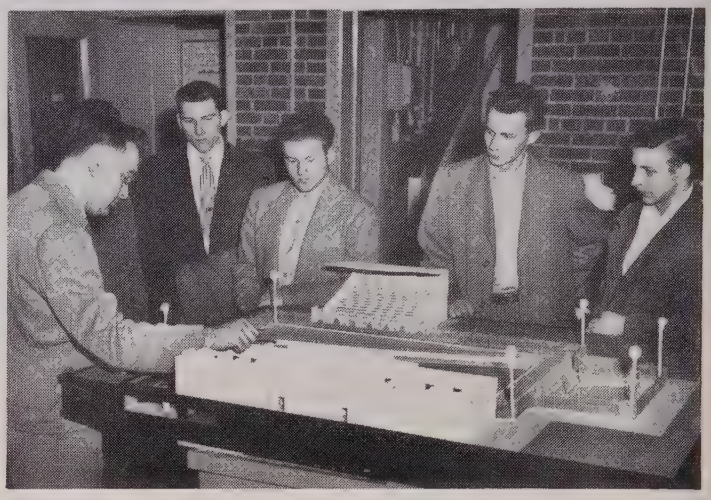
With an eager eye for surveying curves as well as straight lines, Chi Epsilon trained a transit on a rather attractive silhouette in a window frame. The laudation of these civil engineers was anything but latescent as they listed latitude and longitude in the log.

After the passing of the parade, the crowds swarmed into engineering buildings to view the exhibits of "engineering careers in action." Sixteen organizations and departments, under the guidance of Engineering Council, cooperated to present an entertaining and educational array of exhibits.

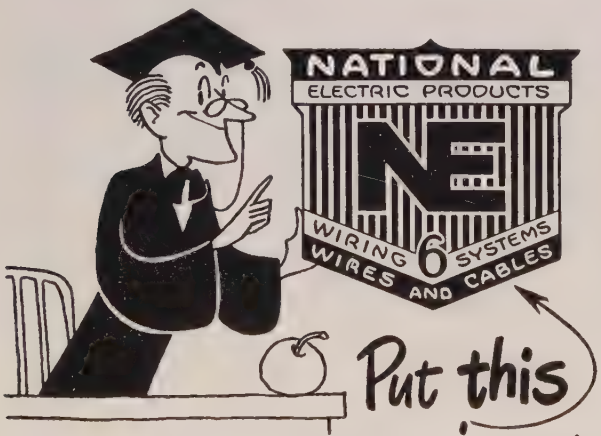
The exhibits, too, were carefully scrutinized by judges for "effective explanation (to the layman) of the represented field of engineering." Judges were H. H. Jordan, Associate Dean of the College of Engineering; R. C. Edmundson, of the State Department of Public Instruction; Fran Myers, of the *News-*

(Continued on Page 26)





Left: Teletype operation is explained to visitors of the Army Communications display in the Electrical Engineering building. **Right:** Modern architecture applied to a swimming pool makes a popular display. (Photos by Howard Wedelstaedt.)



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Parade and I SEE . . .

(Continued from Page 24)

Gazette; and Scott Tyler, of the *Courier.*

First place honors went to the Illuminating Engineering Society, whose activities were directed by Val McClusky. Their presentation was divided into two units: a show explaining the field of illumination and its relation to our lighting needs, and a walk-around exhibit with a time-mirror, color-blind testing, and other audience-participation displays.

With an arrangement of driver reaction test instruments, the Institute of Traffic Engineers took second place. Tom Fry was responsible for organizing this effective presentation.

Even though they were cramped for space, the American Society of Agricultural Engineers' panorama of the progress and development of agricultural implements rated third place. Ancient and modern equipment—from the early steam-driven tractor to the modern cub—were presented by Jere Castor and his boys.

The total number of guests checking attendance cards was 3012. The largest single group of these was high school students with 18.5 per cent. However, judging by the number of guests who ignored the checking stations, the two-day crowd was conservatively estimated at 10,000.

I SEE was a tiring but thrilling venture to the hundreds of engineers who actively participated. The spirit of enthusiasm, unity, and general *esprit de corps* that came forth that weekend was well worth the six months of planning.

Left: The Aeronautical Engineers demonstrate the operation of the wind tunnel. An airfoil section is being tested to show pressures on the surface. **Right:** Castings attract considerable attention in the foundry. (Photos by Howard Wedelstaedt.)

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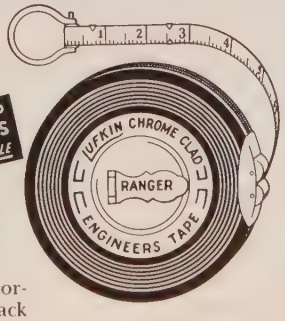

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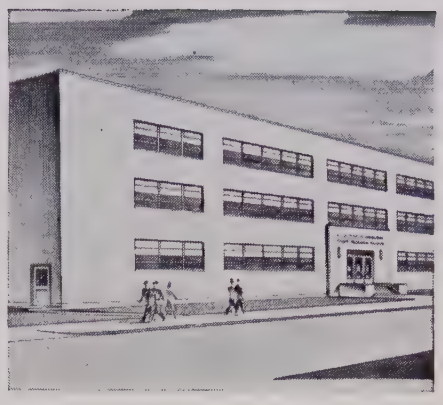
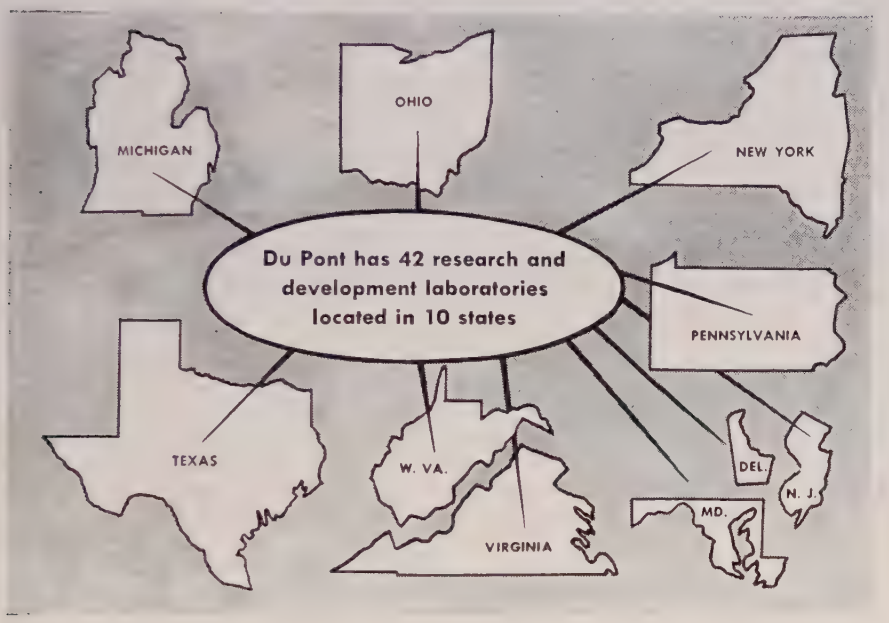


Artist's drawing of the Marshall Laboratory, new Du Pont laboratory for research on finishes. Under construction at Philadelphia, it should be ready for occupancy by late 1950.

RESEARCH DECENTRALIZED

Du Pont scientists pursue their studies from Buffalo, N. Y., to Orange, Texas



THE DU PONT COMPANY is a large company. Its many manufacturing plants are now located from Maine to California. Likewise, the Company's research activities are spread over a wide area. From the Founder's informal scientific experiments on the Brandywine have sprung 42 research and development laboratories in ten states.

Each manufacturing department* has its own research director and maintains facilities for studies in its specialized fields. Thus, research having to do with dyes, neoprene and fine chemicals is centered at Deepwater, N. J.; research on cellophane and other transparent wrapping films at Buffalo, N. Y.; research on viscose rayon at Richmond, Va.; and research on coated and impregnated fabrics at Newburgh, N. Y. These are only a few of the places where Du Pont scientists are now at work. Each manufacturing department does fundamental research as well as applied research on new processes and products.

Many types of training

At any one time, many hundreds of different projects are under way in these laboratories. Though a relatively large number of Du Pont technical people are chemists and chemical engineers, other fields of training are strongly represented.

Among the scientists working with Du Pont are mechanical, electrical, civil, industrial, mining, petroleum, textile, architectural and safety engineers, physicists, metallurgists, biologists and mathematicians. About 30% of these men and women who are engaged in technical activities at Du Pont hold doctor's degrees.

Interchange of thinking

All manufacturing departments may draw on the services of the chemical, engineering and toxicological laboratories of the company in Wilmington. In addition, the Chemical Department's library at the Wilmington Experimental Station circulates reference material, conducts literature and patent searches and issues a weekly abstract of pertinent articles found in the important chemical journals of the world. This supplements normal work of this kind done by the various manufacturing departments.

No matter where a Du Pont research man may work, he has every opportunity to use his best talents, to advance as his abilities develop, and to profit by interchange of thinking with scientists whose minds complement his own.

**There are ten Du Pont manufacturing departments —each conducting research: Electrochemicals; Explosives; Fabrics & Finishes; Film; Grasselli Chemicals; Organic Chemicals; Photo Products; Pigments; Polychemicals; Rayon.*

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Honoraries and Societies . . .

(Continued from Page 12)

act, told why it was passed, and explained some of the tests an engineer must face in order to obtain his license. This was a combined meeting of the ASME and SAE.

In an April election, Professor J. R. Fellows, head of the heating, ventilating, and air conditioning department, was elected honorary chairman of the society for next year.

AFS

Mr. N. J. Dunbeck, president of Eastern Clay Products Inc., gave an interesting talk on clay products at the April 18 meeting of the American Foundry Society. In his talk Mr. Dunbeck told about the types of bindings and binding materials used. He also pointed out the physical properties of different types of clays and their effects on molding sand. A question and answer period, in which Mr. Dunbeck answered the members' questions pertaining to his talk, was held at the end.

There were two meetings of the AFS in May. At the first, Mr. George Dreher of the Foundry Education Foundation was the guest speaker. He told about the help the foundation was giving worthy students. This help takes the form of scholarships and fellowships for research. He also explained the requirements needed to obtain one of these scholarships.

The other May program featured a demonstration by the General Motors' foundry of Danville. This demonstration, which travels all over the country, consisted of a floor show depicting the before and after of core making. Machines which make cores and a movie showing old and new methods of coremaking were shown. This combined meeting of the ASME, MIS, AFS, and SAE was also open to the public.

On May 1 the AFS went on a field trip to the Caterpillar Tractor Company at Peoria. They went as guests of the Caterpillar Company and were taken on conducted tours of the plant. In the evening they attended a meeting of the national American Foundry Society, thus ending a very interesting and educational day.

MIS

The first regular meeting of the MIS was held April 13 with Mr. Robert Schauss of the Illinois Clay Products Company presented as guest speaker. Mr. Schauss holds a degree in metallurgical engineering from the Case School of Applied Science (now the Case Institute of Technology). His talk on the various opportunities of the graduate engineer was both informative and enjoyable.

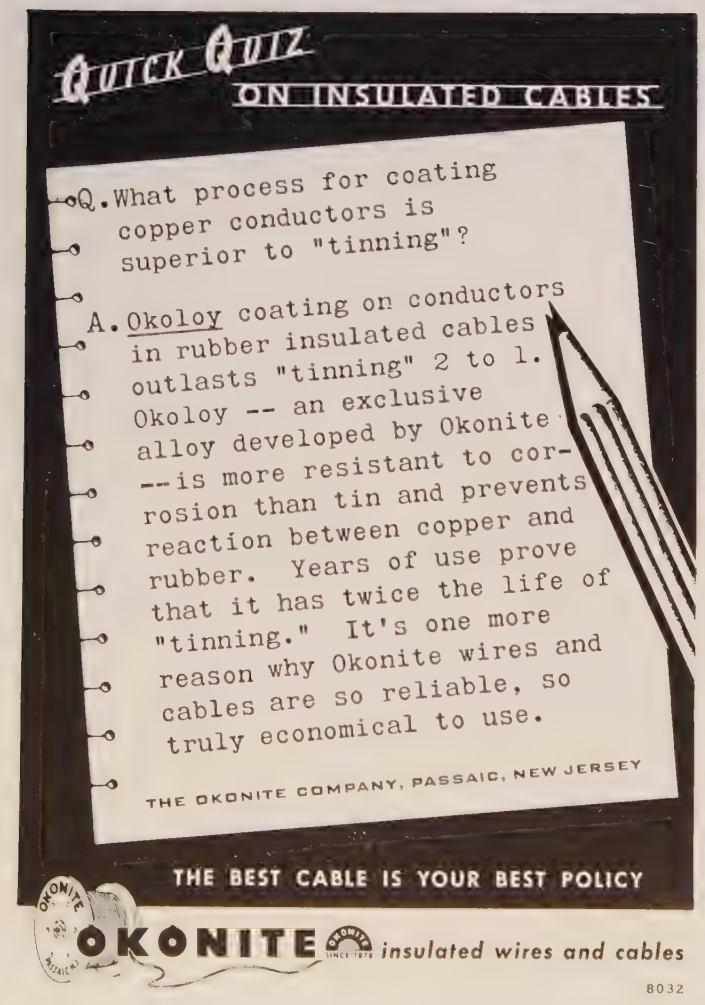
The business meeting that followed laid tentative plans for the annual picnic to be held on May 20. A highlight of the picnic will be the softball contest between the mining and metallurgical engineers. The faculty of both departments will also display their talents in a horseshoe contest.

MIS officers that were elected at a previous meeting include the following: Bruce W. Capek, president; James J. Skarda, vice president; Ron Black, treasurer; James W. Goodrich, secretary; Robert L. Baird and Donald L. Macleary, engineering council; Eugene J. Schwetz, program chairman; Bernt G. Iverson, publicity chairman; John T. Keim and John M. St. John, membership chairmen.

ISPE

Walt Reeder and Don Straznickas have been selected as outstanding engineering students by the local chapter of the Illinois Society of Professional Engineers, according to Professor W. J. Putnam, chairman of the awards and resolutions committee of the society.

(Continued on Page 30)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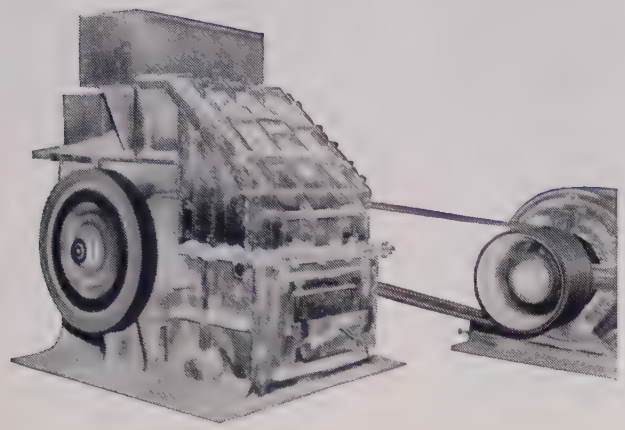

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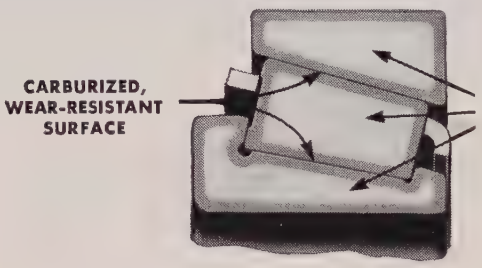

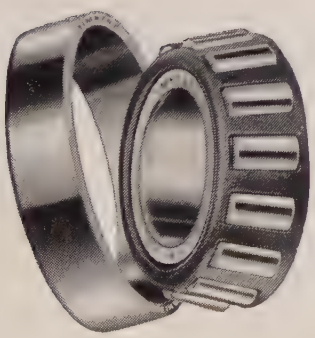

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Honoraries and Societies . . .

(Continued from Page 28)

The two men were honored at the monthly dinner meeting of the Professional Engineers, Thursday evening, May 4, at the University Club, when they received Junior Memberships in the society.

Reeder, an outstanding student in aeronautical engineering, has been recommended to receive the Consolidated-Vultee Aircraft Corporation Fellowship for graduate study here at the University after his graduation this June. Straznickas, a senior in mechanical engineering, expects to enter engineering work in his home town of Rockford, following his June graduation.

The Professional Engineering Society awards are made each year to the two senior students in the College of Engineering deemed to be outstanding by the Society's awards and resolutions committee.

IRA O. BAKER AWARDS

At the 25th annual Ira O. Baker civil engineering convocation May 10, Gene Hankins and Hartman Mitchell were named the outstanding senior civil engineering students. These winners were chosen for excellence of scholarship, personal qualities, and professional activity. Besides receiving prizes of $75 and $25, respectively, they received certificates and will have their names engraved on the bronze tablet outside the C. E. office in C. E. H.

Speaking at the convocation was John I. Parcel of St. Louis, a nationally-known consulting engineer and alumnus of 1909. He was a student under the late Professor Baker who endowed the prizes.

SBACS

Flash! Each member of the Student Branch of the American Ceramic Society received a whole pig at the 25th annual banquet held May 8. In case you're thinking of calling up the nearest ceramic engineer for tomorrow's bacon, we had better inform you that the pig was made of china, and therefore hardly fit for human consumption. A real honest-to-goodness pig was served at the banquet however, and afterwards a talk was given by Mr. J. J. Svec of Ceramic Industries Inc.

Almost all of the senior ceramic engineers attended a meeting of the national American Ceramic Society which was held April 23-27.

On April 12 a meeting was held with Mr. Heater and Mr. Reid of the Engineering Experiment Station as guest speakers. The subject of their talk was "Engineering Report Writing." Mr. Heater spoke on the drawing of graphs and flow sheets and how different types of graphs are used. Mr. Reid pointed out the methods of organizing a report, and the advantages of turning in clear, concise reports.

John J. Brouk, alumnus of Illinois and vice president in charge of production for the Precast Slab and Tile company, spoke at the March meeting of the SBACS. His talk was on the properties and uses of perlite, a light weight derivative of a volcanic ash. Among some of its uses, as Mr. Brouk pointed out, is the making of cements and plasters.

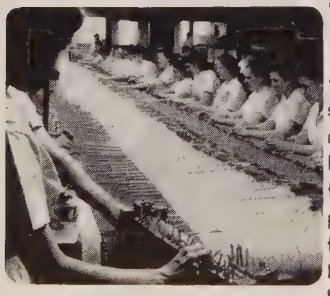
All members are working on the *Illini Ceramist*, the yearbook of the society. The yearbook includes individual pictures of the seniors and group pictures of the other classes, along with a section on activities. It is dedicated to C. W. Parmelee, former head of the Ceramic Department.

A softball team has been organized by the society and it has been competing in the intramural games.

The trouble with most fellows who boast of being self-made men is that they went on a strike before they completed the job.

Office and Plant are Modern Throughout

New Pharmaceutical Laboratories Air Conditioned with Frick Refrigeration



Assembling Expendable Transfusion Sets

Baxter Laboratories, which have the largest production of intravenous solutions and blood transfusion equipment in the world today, use two Frick NEW "ECLIPSE" compressors for cooling the offices, research departments, and many work areas in their recently completed plant at Morton Grove, Ill. This covers 300 by 400 ft. Frick installation made by Midwest Engineering and Equipment Co., Sales Representatives in Chicago.

Two Frick NEW "ECLIPSE" Compressors

The Frick Graduate Training Course in Refrigeration and Air Conditioning, Operated over 30 Years, Offers a Career in a Growing Industry.

DEPENDABLE REFRIGERATION SINCE 1883
FRICK CO.
WAYNESBORO, PENNA. U.S.A.
Also Builders of Power Farming and Sawmill Machinery

Here's a Real Bargain for You

JUNE GRADUATES

If You ACT NOW!

Special membership rates are available to you if you join the Alumni Association prior to graduation. After graduation, the regular membership rates will apply.

	Special	Regular	Savings
One Year	$ 1.00	$ 4.00	$ 3.00
Four Year	4.00	16.00	12.00
*Life Member	70.00	80.00	10.00

*Payment Plan: $75.00—$15 Down, $15 a Year for Four Years

•

U. of I. Alumni Association

227 Illini Union

SPRINGBOARD TO A CAREER IN ENGINEERING

by J. F. ROBERTS
Manager, Hydraulic Department
General Machinery Division
ALLIS-CHALMERS MANUFACTURING COMPANY
(Graduate Training Course 1919)

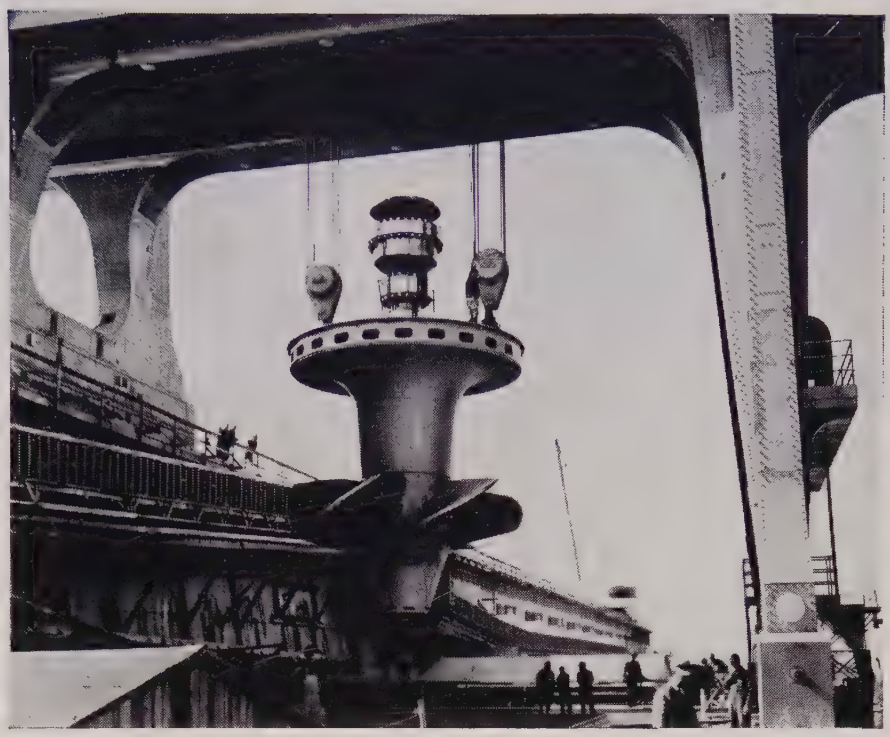
YOU HAVE to start somewhere—and as far as I know, flagpole painting is the only job where you start at the top. Next best thing is to get in where there are many opportunities, and many interesting, worthwhile paths to follow—particularly if you are not entirely sure just what type of work you want to do. You then have a chance to try more than one field, and eventually find the work that will give you the most in satisfaction and success.

J. F. ROBERTS

Growth of Hydraulics

The field I'm best qualified to discuss is hydraulic engineering. Crude waterwheels were man's first mechanical source of power. Today, in highly perfected modern form, they're still a major source of abundant, low-cost electric power. The field is constantly expanding and holds a world of opportunity. Hydraulic power becomes increasingly important to the nation as the need for low-cost power steadily increases. Moreover, a hydraulic plant once installed produces energy with a minimum of manpower. There's no fuel to mine, prepare, ship, unload and burn—small operating personnel is required.

Right now at Allis-Chalmers we're designing and building turbines for vast new hydro-power projects, not only for the U.S.A. and Canada, but also for Mexico, South America, Norway, New Zealand and the Philippine Islands. We're also restoring many veteran turbines to better-than-original efficiency and capacity after long years of faithful performance.



Kentucky Dam TVA Field erection view of 250-ton gantry crane lowering hydraulic turbine assembly. One of five 44,000 hp, 48-ft. head, Kaplan type turbines.

Hydraulics was a field that I hadn't seriously considered as an undergraduate at the University of Wisconsin. I graduated as a Mechanical Engineer in 1918, and entered the Allis-Chalmers Graduate Training Course in January 1919. It was there that I got interested in the big waterwheels.

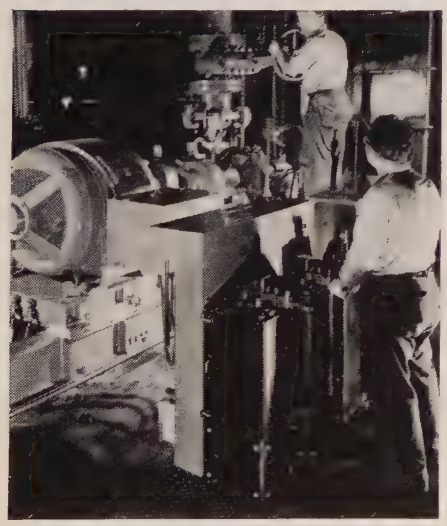
My first assignment was in steam turbine erection. Then I moved over on the hydraulic turbine test floor. In May 1919 I was sent to North Carolina on the acceptance tests of a big hydro-electric power installation. I continued with hydraulic field work such as tests and trouble shooting until 1925, when I went into the sales end of the work. Two years later I left the manufacturing side and became Hydraulic Engineer for the Power Corporation of Canada, supervising the design and installation of some 15 plants.

In 1936 I became Hydraulic Engineer for the U. S. Government TVA, involving 12 projects and 30 large units. I returned to Allis-Chalmers in 1942 as Manager of the Hydraulic Department—and had the unique experience of building some of the same turbines that I had purchased for TVA.

Vantage Point for All Industries

These personal notes serve to illustrate two interesting facts about the Allis-Chalmers Graduate Training Course. First, it's tailor-made for each student. Since 1904, graduate students here have been helping plan their own courses—making changes as they went along and new interests developed. They've had an opportunity to divide their time between shop and office—follow important projects through from drafting board to installation.

Second, the organization is in close contact with virtually all phases of industry: hydraulic or steam electric power plants and utilities; mining, smelting and rock products; public works; steel and metal working; textiles; food processing; flour milling. Allis-Chalmers builds basic machinery for ALL these industries and many more. Its engineers, executives, salesmen and production experts have a ringside seat for industry in action.



Graduate students conduct performance tests of centrifugal pump units.

ALLIS-CHALMERS

Allis-Chalmers Manufacturing Company, Milwaukee 1, Wisconsin

Introducing . . .

(Continued from Page 14)

for 11 months at Corpus Christi, Texas, and Memphis, Tennessee. After graduation at Memphis on a Friday afternoon, Burton started teaching elementary transmitter theory and practice the following Monday in the same school. About his nine months of teaching, he comments, "If it had been any place but the Navy I would have enjoyed it."

Burton hails from "the little city of big music," Mt. Carmel, Illinois. He worked his own way through high school as service station attendant, truck driver, and welder. Besides these time-consuming tasks, he took part in the Science club and National Honor Society.

While getting his first taste of college at Purdue University, Burton made the freshman honorary, Phi Eta Sigma. Here on the Boneyard campus, he has become vice president of AFS and was in charge of the sand lab exhibit for I SEE.

Burton lost his bachelorhood last June 18, but hasn't complained about the loss. He has a fairly neat and enjoyable home in a local trailer.

In order to pick up some industrial experience, Burton hopes to work at the General Motors foundry at Danville this summer.

Navy Pier . . .

(Continued from Page 16)

At this time the guides, who were specialists in some particular phase of the company's operations, answered any questions put to them by their guests. Here any points not clear at some part of the tour was explained to the satisfaction of the student or instructor. At the close of this review, souvenir pencils were distributed to the visitors along with a booklet explaining the company's operation.

From tours such as these, engineering students can see how things are done industrially as well as become acquainted with the various fields which their particular branch of engineering covers. The students at Navy Pier will be informed when the time comes for them to seek employment. They have the opportunity to see industry in operation, and they are taking advantage of this opportunity.

The acrobat we don't enjoy watching is the fellow who stands on the Constitution while gnawing at its foundation.
—Tale Lights.

* * *

Many an argument is sound—merely sound.—*Tampa Daily Times.*

Aero E: "I'll flip a coin. If it's heads, we go to the party. If it's tails we go to the game. If it stands on edge, we study."

* * *

When a scoutmaster asked his troop whether or not each had done his good deed for the day, three members admitted they hadn't . "In that case," they were told, "leave this meeting and don't return until you've lived up to our motto of one good deed a day."

A half hour later the boys returned, dishevelled and flushed. "I did my good deed, sir," the first scout said. I helped an old lady cross the street."

"Me, too," added the second. "I helped the same old lady cross the street."

"So did I," chimed in the third member.

"Do you mean," the scoutmaster demanded, "that it took all three of you to help one old lady cross the street?"

The spokesman for the trio lowered his head. "Yeah," he replied. "You see, sir, the old lady didn't want to cross the street in the first place."

* * *

An automotive invention that is greatly needed is brakes that will automatically get tight when the driver does.

* * *

BMOC: "Why do the most important men on campus always get the prettiest girls?"

Coed: "Oh, you conceited thing!"

* * *

Two small boys came into the dentist's office. One said to the dentist: "I want a tooth out, and I don't want gas because I'm in a hurry."

Dentist: "That's a brave little boy. Which tooth is it?"

Little Boy: "Show him your teeth, Albert."

* * *

Sam: "Listen heah, boy, jes' what kind of life you been livin'?"

Rastus: "Oh, ordinary, jes' ordinary."

Sam: "Well, if yo' pulls any mo' aces out o' yo' shoe, yo' ordinary life is goin' to mature."

* * *

Shtarkle, shtarkle, little twink.
Who the heck you are, I think.
I'm not under the alcofluence of inkohol.
Though some thinkle peep I am.

* * *

If having a good time is all there is to life, monkey has man outdistanced completely, both in amusing others and being amused.

* * *

Some fellows stay right in the rut, while others head the throng. All men may be born equal, but they don't stay that way long.

Teacher: "If you have ten potatoes and must divide them equally among three persons, how would you do it?"

Johnny: "I'd mash them."

* * *

Some people use religion like a bus. They ride on it only when it is going their way.

* * *

First Cook: "Say, the garbage man is outside."

Second Cook: "O.K. Tell him to leave three cans today."

* * *

"No man can do his best work while he harbors revengeful or even unfriendly thoughts toward others."
—Dr. Marsden.

* * *

Anatomy prof: "What are the names of the bones in your hand?"

Stude: "Dice."

* * *

The man who wants to do something finds a way; the other kind finds an excuse.

* * *

Teacher: "In what battle did General Wolfe cry, "I die happy?"

Johnny: "His last one."

* * *

A wise man thinks all he says; a fool says all he thinks.

* * *

Two men who had been bachelor cronies met for the first time in five years.

"Tell me, Tom," said one, "did you marry that girl, or do you still darn your own socks and do your cooking?"

"Yes," Tom replied.

* * *

The fellow who can't talk without swearing must be just plain dumb. There are 450,000 words in the dictionary; and if he can't learn enough of them to express his ideas without using noises not in the dictionary, there's something wrong with him.

* * *

A chap was arraigned for assault and brought before the judge.

Judge: "What is your name, occupation, and what are you charged with?"

Prisoner: "My name is Sparks; I am an electrician, and I'm charged with battery."

Judge: "Officer, put this guy in a dry cell."

* * *

Only people who do things get criticized.

* * *

"Alcohol has little value as medicine, and it certainly carries distinct dangers to those who use it as a drink. I have never found it necessary to use it for medicine." *—Dr. William J. Mayo.*

HOW BIG

SHOULD AN OIL COMPANY BE ?

HERE IS A STRAIGHT ANSWER FROM ONE OF THE OLDEST COMPANIES IN THE INDUSTRY:

Socony-Vacuum is the size that it is — neither the biggest nor the smallest in the Petroleum Industry — because it is an efficient size for the kind of business we do.

Efficiency is the key to a company's size — for it is the key to what the American public wants, the most for its petroleum dollar.

Under the American system of business, a company that operates *inefficiently* soon *loses business* to other companies able to offer the public more value at lower cost. That's how American competition works — and if any company gets so big that efficiencies inherent in mass operation are more than offset by increasing costs — *competition* will cut that company to a proper size.

To put it another way:

A *company* is as strong as its competitive efficiency —

In turn, an *industry* is as strong as its companies —

And in turn, a *nation* is as strong as its industries.

Thus, *every* company, big or little, must be *"big" enough* to serve the best interests of the people in the area it covers!

Since 1866— the Flying Red Horse Companies have practiced *Competitive Efficiency* to supply you with Finest Petroleum products at the lowest possible cost!

The Flying Red Horse Companies

SOCONY-VACUUM OIL COMPANY, INC.

and Affiliates: MAGNOLIA PETROLEUM CO. • GENERAL PETROLEUM CORP.

Without beam strength—or, for that matter—without all of the strength factors listed opposite—no pipe laid 100 years ago in *city streets* would be in service today. But, in spite of the evolution of traffic from horse-drawn vehicles to heavy trucks and buses—and today's vast complexity of subway and underground utility services—cast iron gas and water mains, laid over a century ago, are serving in the streets of more than 30 cities in the United States and Canada. Such service records prove that cast iron pipe combines all the strength factors of long life with ample margins of safety. No pipe that is provably deficient in any of these strength factors should ever be laid in city streets. Cast Iron Pipe Research Association, Thos. F. Wolfe, Engineer, 122 So. Michigan Ave., Chicago 3.

CAST IRON

Strength factors of Long Life!

No pipe that is provably deficient in any of these strength factors should ever be laid in city streets

BEAM STRENGTH — When cast iron pipe is subjected to beam stress caused by soil settlement, or disturbance of soil by other utilities, or resting on an obstruction, tests prove that standard 6-inch cast iron pipe in 10-foot span sustains a load of 15,000 lbs.

CRUSHING STRENGTH — The ability of cast iron pipe to withstand external loads imposed by heavy fill and unusual traffic loads is proved by the Ring Compression Test. Standard 6-inch cast iron pipe withstands a crushing weight of more than 14,000 lbs. per foot.

SHOCK STRENGTH — The toughness of cast iron pipe which enables it to withstand impact and traffic shocks, as well as the hazards in handling, is demonstrated by the Impact Test. While under hydrostatic pressure and the heavy blows from a 50 pound hammer, standard 6-inch cast iron pipe does not crack until the hammer is dropped 6 times *on the same spot* from progressively increased heights of 6 inches.

BURSTING STRENGTH — In full length bursting tests standard 6-inch cast iron pipe withstands more than 2500 lbs. per square inch internal hydrostatic pressure, which proves ample ability to resist water-hammer or unusual working pressures.

CAST IRON PIPE SERVES FOR CENTURIES

DISPLAYS MASSIVE PRODUCTS—A Diesel locomotive can roar across the Rockies—all on a movie screen in a prospect's office. All because photography can take huge things or small, and make them of a size for a salesman, teacher, or demonstrator to show.

Photography makes big things small—small things big—and business comes out ahead

MAKES MICROSCOPIC DETAILS CLEAR—Photography takes great magnifications produced by the electron microscope (20,000X) on fine-grain Kodak plates, enlarges and records them up to 100,000X on Kodak projection papers. Previously undetectable details and new facts are revealed.

REDUCES FILING SPACE BY 98%—With microfilming, bulky records can be reduced and stored on a few rolls of film. 675 drawings, 24" x 36", can be recorded on a 100' roll of 35mm. Recordak or Kodagraph Micro-File Film. And everything is quickly ready for reference in the Recordak or Kodagraph Film Reader.

REVEALS STRUCTURE AND CONDITION OF METALS—X-ray diffraction patterns on Kodak films or plates provide important information concerning the crystal structure of metals. These patterns help show how alloys can be improved or new alloys made—give data on the effect of machining, drilling, and punching upon the structure of the material.

With the speed of a flick of light, photography can reduce or enlarge accurately to scale, and without missing the tiniest detail. And that's not all.

It can magnify time with the high speed motion-picture camera so that the fastest motion can be slowed down for study. It can record the penetrating x-ray and reveal internal conditions of materials and products. With movies and stills, it can repeat a story, time and again, without the loss of a single detail.

Yes, photography serves business and industry in many important and valuable ways. It can work for you, too. If you would like to know how, please feel free to write for literature, or for specific information which could be helpful to you. Eastman Kodak Company, Rochester 4, New York.

FUNCTIONAL PHOTOGRAPHY

serves industrial, commercial, and scientific progress

Kodak

TRADE-MARK

Public Opinion—
NOTHING IS STRONGER
...given the facts
NOTHING IS WISER

On Bigness

We are today a much larger country than we were short years ago. Comparing 1930 with 1948, Federal government expenditures have grown from $3.6 billion to $40 billion. National income has grown from $75 billion to $226 billion.

* * *

Is small business holding its own with big business in this growth? Or being driven from the American scene, concentrating business into a few hands?

* * *

In 1900, there were 15 firms for each 1000 people. Today there are 18. (Apparently small business is not losing ground.) The average firm has the same number of employees as at the beginning of the century.

* * *

According to a survey by the Federal Reserve Board covering approximately 2,000 concerns, during the war, the small and medium-sized firms in total increased their profits, assets and net worth faster than did large concerns. In 1948, there were in operation one-third more business units than in 1944.

* * *

Can new businesses crowd in and climb to the top? In 1935, to take the electrical business as an example, only 153 companies did over $500,000 business. By 1947, there were over 342 companies with sales in that higher bracket.

* * *

General Electric, in spite of its growth during the past 20 years, has only been able to keep pace with the growth of industry and of the country. We estimate that our percentage of production in the electrical industry was about 23% in 1930, 25% in 1940, and is today approximately 24%.

* * *

It is the job of all business and all industry to supply the ever-expanding needs of people. Big jobs require big tools. No company and no industry in the American economy is yet big enough to bring enough goods to enough people.

You can put your confidence in—

GENERAL ELECTRIC